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Influencing Traits Before Birth



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05 JUN 2003

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Preface

Is it possible to create “designer babies”? Is it ethical? Are current legal responses to these possibilities adequate? This book is a response to these questions. It seeks to explore the legal and ethical issues raised by attempts to influence traits before birth. In essence, this book presents a moral critique of legal positions with regard to what is often referred to as “creating designer babies”—what I term “prenatal influence of traits.”

The details of the law and science can, however, be no more than a snapshot of the position as it stood at the time of writing. I have made every effort to state the legal and scientific position as of November 2001. Nonetheless, ignorance and misunderstanding are acute dangers for a project as ambitious as this. Despite these dangers I have attempted to provide detailed appendices on the relevant laws of no less than 17 countries, viz. the 15 EU countries, Canada and the US. I have also attempted to keep abreast of the current science, which has been no easy task for a non-scientist in such a rapidly developing area.

The legal and scientific background is, however, merely the subject matter of the book’s argumentative framework. To some this framework will be unattractive simply because it stands as a development of a particularly ambitious moral theory—Alan Gewirth’s Principle of Generic Consistency (PGC). I hope, however, that this book’s relevance extends beyond the implications of any one moral position. This was certainly the intention and many aspects of the developed moral framework are equally required by other moral theories.

Given the size of the book’s subject matter some selectivity is unavoidable. I have chosen to focus on certain techniques of prenatal influence and their use as triggers for regulatory oversight. Thus, attention is directed towards abortion and prenatal diagnosis, preimplantation genetic diagnosis, embryo research, cloning, and prenatal gene therapy.

This work displays debts to many people.

First, I would like to thank Deryck Beyleveld, who supervised the doctoral thesis on which this book is loosely based. Anyone who has been supervised by him will understand much of my gratitude. Mine is, however, even greater because, as acknowledged in the text, some of the ideas in this book stem from our co-authored work.

Second, I would like to thank those who provided information on the laws of other jurisdictions over the last few years. I would particularly like to thank (in alphabetical order) Tim Caulfield (Canada), Tina Garanis-Papadatos (Greece), Hille Haker (Germany), Pierre Langeron (France),

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Third, I would like to thank those who were kind enough to proof-read early parts of the text, especially Fergus Malone. Special thanks must go to Julie Prescott who took care of the creation of the camera-ready copy and the final proof-reading.

Fourth, I am grateful to those who commented on my earlier work and drafts of this book. These include Darren Shickle, Stuart Toddington, and, most crucially of all, the publisher's reviewer. The advice of Jennifer Gunning has been invaluable. I, of course, bear sole responsibility for what remains.

Most important of all has been the love and support of my family. I would like to dedicate this book to Liz and our daughter, Abigail.

Shaun Pattinson

Postscript

By the time you read this book it is inevitable that the law and science will have moved on. Even in the short time between finalising the text and preparing the camera-ready copy, Crane J's decision in *R (on application of Quintavalle) v Secretary of State for Health* [2001] EWHC Admin 918 has been overruled by the Court of Appeal ([2002] EWCA Civ 29). By the time this book is published, an appeal might well have been heard by the House of Lords. Developments such as these, however, are no more than a minor inconvenience and formal legal changes have hitherto been painfully slow in the majority of the countries studied. Moreover, although legal and scientific developments can affect the application of the critical framework developed in this book, the framework itself is not affected by such contingencies.

January 2002

As many readers will be aware, during the last few months a number of countries have enacted legislation or are close to doing so (including Canada, France, the Netherlands and Sweden). With the exception of embryo research (which is slowly gaining great legislative acceptance), these developments do not reflect any great movement in the debate.

June 2002

Chapter 1

Introduction

Few can avoid feeling sympathy for a child with Lesch-Nyhan syndrome. Boys with this genetic condition are often mentally disabled and suffer extreme pain similar to that associated with gout. What is more disturbing is that its victims compulsively self-mutilate—often chewing off their lips, biting off their finger tips, or gouging out their eyes.¹ This condition surely invites our sympathy. It also raises difficult ethical (and regulatory) questions. Would it be wrong to use genetic technology to remove this condition from an unborn child? Would it be wrong to discard unimplanted embryos carrying the genetic mutation associated with this condition? Would it be wrong to abort a fetus if it carried this gene? Indeed, would it be wrong to test for it? If all a potential mother's eggs carried this genetic mutation, would it be wrong for her to use a cloning technique to avoid it? If the mother could avoid the effects of this genetic mutation by taking certain drugs when pregnant, would she be doing wrong if she did?

At present, many of these questions are purely hypothetical,² but science does not stand still. It is now possible to test for numerous genetic conditions before birth or, where fertilisation takes place outside of the body, before implantation into the womb. It is, in theory, possible to create a *genetically* identical copy of a living human being. It might one day be possible to genetically modify an embryo either before it is implanted or as it develops in the womb. It might even become possible to influence the gestating child by changing the environment in the womb³ or by creating an artificial womb.

The techniques that I am alluding to are those offering prospective parents opportunities to design their babies or, more accurately, to influence their traits before they are born. This book is concerned with the regulation of these techniques, which for convenience I will call the "techniques of *prenatal* influence."⁴ My task is to probe the moral legitimacy of parental

¹ Information on Lesch-Nyhan syndrome extracted from Kitcher 1996, especially 82; and Holm 1998, 184. See also Lesch and Nyhan 1964.

² It is, however, possible to test for the genetic mutation causing this condition during gestation (see Connor and Ferguson-Smith 1997, 142; and Graham *et al.*, 1996).

³ As the thalidomide incident demonstrates, it is already possible to influence *some* characteristics by altering the environment in which the embryo or fetus develops.

⁴ I am using the word "prenatal" to refer to the period before birth, not just the developmental period in the womb. This cut-off point is not being upheld as

desires in the context of attempts to regulate the techniques offering the potential to fulfil them—the techniques of prenatal influence.

1.1 Moral Questions

Before we can begin a moral critique of any sort we need a definition of morality. More precisely, we need to distinguish the moral from the non-moral.

The definition used in this book is multifaceted. I use the word “morality” (and related terms) to refer to *prescriptive imperatives* (requirements purporting to be action guiding and addressed at others) that are *categorical* (unconditionally binding irrespective of one’s inclinations or desires and taking precedence over all other imperatives), and *other-regarding* (requiring one to take account of the interests of persons other than oneself).

The purpose of this stipulation is not to legislate on linguistic usage or to establish any substantive conclusion, but to aid expression and communication. Nothing but brevity would be lost if the word “moral” was replaced by a phrase such as “categorical other-regarding imperative” or an elaborate list of its defining components.

Possessing a definition of morality⁵ we can now address what one theorist terms the three central questions of moral philosophy,

First, the authoritative question: Why should one be moral . . . ? . . . Second, the distributive question: Whose interests other than his own should the agent favorably consider in action? . . . Third, . . . the substantive question: Of which interests should favorable account be taken? (Gewirth 1978, 3)

The “authoritative” question requests a rationally adequate justification for the claim that there are moral (as opposed to non-moral) requirements on action. The “distributive” question asks what the objects of moral concern are. It asks to whom or what we owe moral duties. The “substantive” question asks which interests (of those we have duties to) we are required to take account of.

These questions are interrelated, so that answering one goes a long way towards answering the other two. The next section will start with the authoritative question. The chapter will then go on to address less stringent ways of justifying one particular criterion of moral permissibility (in 1.3 below).

significant *per se*, it is merely a stipulation on the subject matter of this book. See Chapter Three for analysis of the specific techniques in question.

⁵ This definition is essentially the same as that adopted by Gewirth 1978, 1.

Thus, this chapter briefly presents a number of ways of justifying a particular criterion of moral permissibility. This criterion purports to be moral in the sense defined above (i.e., it is a categorical other-regarding imperative). It is a criterion of moral rights where the holders of the rights and the bearers of the correlative duties are agents, i.e., beings who have the ability to reflect on their chosen purposes. These rights are rights to the necessary conditions of pursuing purposes at all or with general chances of success.

1.2 The Dialectically Necessary Argument for Morality

The authoritative question is one of the most controversial in philosophy. Justifying morality is certainly made no easier by the definition of morality adopted above.

The moral theory on which I wish to rest my argument runs against the current trend of modern philosophy by claiming to establish a supreme principle of morality without reliance on any form of moral intuition, consensus, or contingency. Such talk of a “supreme principle of morality” certainly fits uneasily with widely accepted beliefs and the main body of moral philosophy. Nonetheless, this particular moral theory seeks to establish an imperative that is uniformly obligatory for all those capable of understanding its prescriptions. This is the moral theory of Alan Gewirth.

In his seminal book, *Reason and Morality* (1978), Gewirth argues that the supreme principle of morality is the Principle of Generic Consistency (hereafter the *PGC*). Gewirth’s theory draws out the self-reflective implications of being an agent, where an agent is a being that has the ability to pursue chosen purposes. Of course, contingencies such as lack of resolve or resources might hinder an agent’s ability to successfully achieve its purposes, but to be an agent it must have the capacity to pursue its purposes. This capacity need not be readily perceptible to others; a purely mental action (such as pondering a mathematical problem) can be just as much a purpose as a physical action (such as walking to the post office). This latter point is relevant to the determination of who, other than oneself, is an agent, which will be discussed in the next chapter.⁶

The most insightful aspect of Gewirth’s argument is its methodology. It adopts what Gewirth terms the “dialectically necessary method.” It is “dialectical” because it is conducted in the form of an internal dialogue, beginning with claims that are made within this first-person perspective. It is “necessary” because all the steps of the argument follow logically (hence

⁶ I refer to the agent as an “it” to avoid suggesting that agents are necessarily male or female or, indeed, necessarily have a sex.

necessarily) from premises that cannot be coherently rejected within this perspective.⁷

Thus, Gewirth argues from the claim of an agent to be an agent within the first-person perspective of that agent. The argument is easier to absorb if divided into three stages. The first stage, seeks to establish that an agent must attach necessary instrumental value to its having those conditions that are necessary for it to act at all or with general chances of success (i.e., the generic features of agency). The second stage, seeks to show that this commits the agent to claiming rights to the generic features (i.e., the generic rights). The third stage of the argument, seeks to establish that an agent must accept that all agents have the generic rights (i.e., Gewirth's supreme principle of morality). I will present this argument first in skeletal form, before explaining in more detail how each step is derived.

It should be kept in mind that this book is primarily concerned with the application of the *PGC* (or any equivalent moral principle), rather than its defence.

1.2.1 Skeletal Outline of the Argument to the *PGC*⁸

Stage I

In claiming to be an agent I must (by definition) accept that

- (1) "I act (or intend to act) for a purpose that I have freely chosen,"

which entails

- (2) "My purpose is good."

Since

- (3) "There are generic features of agency,"

I must accept

⁷ A dialectically necessary argument is to be contrasted with dialectically contingent and assertoric arguments. A "dialectically contingent" argument is one where contingency is introduced by either the premises (i.e., they can be coherently denied), or the method of inference (i.e., the connection between the premises and the conclusion is not necessary). An "assertoric argument" is one where the conclusion follows from premises that are not dialectical, i.e., not tied to the claims of an interlocutor.

⁸ This re-statement follows the structure of Beyleveld 1991, and Beyleveld and Pattinson 1998. I have, however, endeavoured to avoid the formalistic style of these works.

- (4) "My having the generic features is good for my achieving my purpose *whatever* that purpose is." That is, "My having the generic features is (categorically instrumentally) good."

Stage II

This entails,

- (5) "I (categorically instrumentally) ought to pursue my having the generic features,"

which entails

- (6) "Other agents categorically ought not to interfere with my having the generic features *against my will*, and ought to aid me to secure them when I cannot do so by my own unaided efforts *if I so wish*,"

which is to say,

- (7) "I have both negative and positive rights to have the generic features." In short, "I have the generic rights."

Stage III

This entails (as can be shown by *reductio ad absurdum*),

- (8) "I have the generic rights *because* I am an agent"

which, by the logical principle of universalisability, entails

- (9) "Every agent has the generic rights *because* it is an agent." In short, "All other agents have the generic rights."

Thus,

- (10) "All agents have the generic rights."

Thus, by the logical principle of universalisability,

- (11) It is dialectically necessary *for every agent* to accept that *all* agents have the generic rights. This statement is referred to as the Principle of Generic Consistency (*PGC*).

1.2.2 The Argument to the *PGC* Explained

Since an agent is, by definition, a being that has the capacity to act for freely⁹ chosen purposes, it must perceive any purpose that it pursues (or

⁹ The word "freely" here serves two purposes. First, it refers to what may be called external freedom, freedom from coercion or action forced by others. That is to say, if I

intends to pursue) as “good,” in the sense of worth pursuing. This is simply because it is analytically true that a being who acts (or intends to act) for a freely chosen purpose must attach sufficient value to its purpose to motivate it to pursue that purpose, i.e., it must proactively value its purpose.

Since an agent must proactively value its purpose, it must attach at least instrumental value to anything that is necessary for it to achieve that purpose. This follows from the agent reasoning according to principles that it must accept in order to be an agent. These include the principle that those freely pursuing an end must be prepared to pursue the means necessary for achieving that end. Thus, an agent must (if it is to avoid self-contradiction) attach at least instrumental value to those conditions that are necessary for it to act at all or with general chances of success. These conditions for sake of brevity are collectively referred to as the “generic features of agency.”

If the agent is to avoid denying what has just been established—that it must attach (categorical instrumental proactive) value to its having the generic features—it must claim that it (categorically instrumentally) ought to pursue and defend its possession of the generic features.

Since an agent needs to have the generic features in order to pursue and defend its possession of the generic features, an agent must be against interference with its possession of the generic features against its will. For the same reason, an agent must also be in favour of others helping it to secure possession of the generic features, when it wishes to have such help and is unable to secure them without help. Thus, the agent must claim that other agents categorically ought not to interfere with its having the generic features against its will, and ought to aid it to secure them when it cannot do so by its own unaided efforts, if it so wishes.

This claim can be rephrased in terms of claim-rights as interpreted by the will/choice theory of rights.¹⁰ Thus, it is dialectically necessary for an

am coerced into acting, I am not acting for a freely chosen purpose in the sense required to move from step (1) to (2). Second, it is used to refer to what may be called internal freedom. The move from step (1) to (2) does not require the agent to be free from deterministic causality, all that is necessary is that the agent feel free, in the minimal sense required for it to necessarily value its purposes. Perhaps, this sense is that of being capable of operating on the *belief* that it has *some capacity for choice/control* over its actions. If so, this psychological freedom (which will be purely illusionary freedom if the agent is not actually free) seems to be presupposed by its denial, because if I believe that I'm not free I must accept that this belief is itself caused, but this would mean that its truth value is irrelevant. By irrelevant, I mean that it would be no more a self-descriptive claim than the numbers displayed on a calculator's screen are for the calculator. Thus, any self-reflective being would appear to be required to believe itself to be free in this minimal sense.

¹⁰ Claim-rights are justified claims imposing correlative duties on others. There are two principal theories or conceptions of claim-rights: the benefit (or interest) theory and

agent to claim that it has negative and positive rights to have the generic features. Collectively these rights can be referred to as the “generic rights.” The specific content of which will be analysed in the next chapter.

So far, it has been shown that it is dialectically necessary for an agent to claim the generic rights for itself. At this point the argument is not other-regarding, i.e. it does not require the agent to take into account the interests of other agents. The next step then is to move from this self-regarding (albeit other-referring) claim to an other-regarding claim.

To do this Gewirth looks towards the “logical principle of universalisability,” which he states as

if some predicate P belongs to some subject S because S has the property Q (where the ‘because’ is that of sufficient reason or condition), then P must also belong to all other subjects $S_1, S_2 \dots, S_n$ that have Q. If one denies this implication in the case of some subject, such as S_1 , that has Q, then one contradicts oneself. For in saying that P belongs to S because S has Q, one is saying that having Q is a sufficient condition of having P; but in denying this in the case of S_1 , one is saying that having Q is not a sufficient condition of having P. (Gewirth 1978, 105)

This principle is purely logical. Properly regarded it is no more than an explanation of what the word “because” means when it is used to import the concept of sufficient reason. All it claims is that if having Q is a sufficient reason for the claim that the subject S has P, then any subject (S_n) that has property Q will also have P.

However, before Gewirth can apply the principle of universalisability he must first establish that an agent must regard the fact that it is an agent as the sufficient reason for its claim that it has the generic rights. In other words, he needs to show that the agent's claim that it has the generic rights (which has just been established) entails the claim that it has the generic rights *because* it is an agent.¹¹

To do this Gewirth invokes what he terms the “Argument from the Sufficiency of Agency” (the ASA) (see Gewirth 1978, 110). This argument takes the form of a *reductio ad absurdum* in that it seeks to show that by

the will (or choice) theory. The difference between the benefit and will theory is that the latter requires the right-holder to have the capacity to waive the benefit of the right (i.e., be an agent).

Above it has been shown that it is dialectically necessary (and hence justified) for an agent to direct claims of non-interference/aid at other agents, and since an agent can choose not to pursue/defend its generic features—it will only contradict itself if it does not attach at least *instrumental* value to its generic features—the agent can waive the benefit of the correlative rights. Thus, the argument requires the adoption of the will theory of rights.

¹¹ I use the word “because” to refer to a sufficient reason.

denying the claim that it has the generic rights *because* it is an agent, the agent denies that it has the generic rights. This is because denying that it has the generic rights for the sufficient reason that it is an agent, requires the agent to assert that it has the generic right because it has a property that is not necessarily possessed by all agents. However, this implies that if the agent lacked this property it would not have the generic rights, which contradicts the previously established statement, made on the basis of its claim to be an agent, that it has the generic rights. Thus, it is dialectically necessary for an agent to claim that it has the generic rights because it is an agent.

All that the ASA does is make explicit what has already been shown to be dialectically necessary.

The principle of universalisability now operates on this claim to show "every agent has the generic rights *because* it is an agent." This dialectically necessary claim, when combined with the agent's previous dialectically necessary claim that it has the generic rights, entails the dialectically necessary claim that all agents have the generic rights.

Applying the principle of universalisability to this, since an agent denies that it is an agent if it does not accept that all agents have the generic rights, it follows that every agent denies that it is an agent if it does not accept that all agents have the generic rights. Thus, it is dialectically necessary for every agent to accept that all agents have the generic rights. This is the Principle of Generic Consistency—the *PGC* for short.

If successful, this argument provides answers to the authoritative, substantive, and distributive questions (1.1, above). The authoritative question asks what justification can be given for accepting that there are moral requirements on action. The answer, according to the argument above, is that I (any agent) would deny that I am an agent if I did not adopt a moral point of view (as defined above). The distributive question asks who the objects of moral concern are. The *PGC* answers that agents are the objects of moral concern (see Chapter Two). The substantive question asks which interests (of those I owe duties to) must I take account of. According to the *PGC*, I must take account of the generic rights, which are the rights of agents to the generic features, therefore the generic features are the interests that I must take account of.

1.2.3 Evaluating the Argument to the *PGC*

Given its conclusion, it is no surprise to find a great deal of academic resistance to this argument. Every stage of the argument has been critically probed by some of the world's most respected philosophers. The consensus is that there is a flaw in the argument, although there is no consensus as to

where this flaw is.¹² I base my argument on it because, as far as I can tell, no one has yet raised a successful objection. For those who are still not convinced two further points should be noted. First, Gewirth has addressed many of his critics, and Deryck Beyleveld has addressed just about all criticisms made up until 1990.¹³ Although objections are still being made, few take account of the responses already made and, in my opinion, all are variations of previously answered criticisms.¹⁴ Second, even if the argument to the *PGC* is on final analysis unsuccessful, my argument can be read as an argument from stated presuppositions. In short, *I am not in this book seeking to defend the PGC, but to apply it.*

The claims made for this argument are easy to misunderstand. The argument is dialectically necessary so it does not establish morality to be true *tout court*. It does not, as Gewirth puts it, establish the *PGC* as assertorically true. However, the lack of force independent of its dialectical foundations is more a theoretical point than a practical one. For all practical purposes the *PGC* must be treated as if it is true, because all those capable of following moral prescriptions are by definition agents (see Beyleveld 1991, 111–113).¹⁵ Nevertheless, it must be remembered that on a purely theoretical level what is necessarily true is not the *PGC*, but the claim

¹² The argument to the *PGC* does, however, have its supporters, including Buhn (1989; 1995), Beyleveld (1991), Beyleveld and Brownsword (1994), Birsch (1996), Heslep (1989), Hill (1984), Hoffman (1991; 1996), Howie (1990), Kahn (1984), Lloyd and Freeman (1994, 386–387), Phillips (1996), Pluhar (1995), Reamer (1979; 1990), Steigleder (1998), and Toddington (1993a; 1993b).

¹³ Since it is nearly impossible to find every criticism of Gewirth's argument to the *PGC*, there are a few criticisms, written in 1990 or before, that are not directly mentioned in Beyleveld 1991. These include Nozick 1981, 722; Singer 1985; Loudon 1986; Putman 1987; and Freedman 1990.

¹⁴ Criticisms of the argument to the *PGC*, published after 1990, include Davis 1991; Hittinger 1992; Fotion 1993; Clayton and Knapp 1993, 160; Dyck 1994; Kramer and Simmonds 1996 and 1998; Kramer 1999; and O'Neill 1995. Gewirth has responded to some of these criticisms in Gewirth 1992; 1997a; 1997b; and 1998. Beyleveld 2002 responds to Singer 2000, which presents one of the few criticisms claiming the ASA is invalid. Also, there is a book collating new papers criticising and defending the *PGC*, including a response by Gewirth: Boylan 1999.

¹⁵ Kant makes similar claims for the concept of free will in *Groundwork for the Metaphysics of Morals*, after arguing that a rational being with a will (i.e., an agent) would deny that it was such a being if it did not consider its will to be free.

Now I assert that every being who cannot except *under the Idea of freedom* is by this alone—from a practical point of view—really free; that is to say, for him all the laws inseparably bound up with freedom are valid just as much as if his will could be pronounced free in itself on grounds valid for theoretical philosophy. (Kant 1785 as translated in Paton 1948, 108)

that an agent will deny that it is an agent if it does not accept the *PGC* as the supreme principle of morality.

Another thing that the argument does not do is reduce morality to reason (cf., e.g., Bond 1980; Reiman 1990). Showing that reason commits agents to a supreme moral principle does not reduce moral culpability to intellectual error. The moral culpability lies in violating the rights of other agents, not in violating reason. Logic-based reasoning is merely the means of establishing that we must accept that we have moral obligations, it is not itself the content of our obligations nor will it necessarily motivate us to comply with these obligations.

As shown above, a crucial step in the argument to the *PGC* demonstrates that the sufficient justifying reason for the agent's claim to have the generic rights is its possession of the capacity to value its purposes. Gewirth calls this step the "Argument from the Sufficiency of Agency" (the *ASA*). (The *ASA* links claims 6 and 7 in the skeletal summary of the argument above.) This step appears to make the application of the logical principle of universalisability straightforward. Since agents are (by definition) beings who value their purposes, this property is one possessed by all agents. Thus, the agent from whose viewpoint the argument is conducted must recognise that other agents have the generic rights.

The *ASA* is, therefore, necessary to prove that it is dialectically necessary for an agent to recognise that other agents have the generic rights. This *ASA* works by demonstrating that an agent cannot restrict its claim to the generic rights to its possession of a property that only it possesses if it would still have to claim the generic rights were it to lack that property.

What if, however, the sufficient reason for the agent's claim was that agent's specific valuing on its specific purposes? The agent from whose viewpoint the argument is conducted could not coherently lack this property. This involves a very subtle distinction. It is a distinction between (a) possession of the property defining agents as a class, and (b) possession of one specific (indexical) instance of that property. While (a) will be possessed by all agents, (b) will only belong to the subject of the argument, i.e. the agent from whose viewpoint the argument is conducted. Another agent cannot have (b). You cannot have (a) in the sense that *I* have (a), because you do not have the same relation to *my* purposes that *I* have.

Beyleveld (1991, 288–300) attributes to Scheuermann (1987) the claim that the *ASA* only demonstrates that agents must take (b) to be the sufficient reason for their claim to have the generic rights. Beyleveld argues, rather more fully than I will below, that *even if* this claim is accurate, it does not defeat the argument to the *PGC*.

This objection claims that the argument to the *PGC* assumes, without justification, that any agent can be substituted in *my* dialectical reasoning. However, no such assumption or substitution is necessary. The simple fact of the matter is that (b) implies (a). If *I* reason from *my* pro-active valuation

of *my* purpose, then I must reason from my membership of the class of agents, because if I were not a member of this class, then I would not be able to value my purposes.

To be clear, the relationship between (a) and (b) is not merely one of a general category and one of its sub-categories. (a) implies (b) in a more restrictive sense than "being a bachelor" implies "being unmarried." From my dialectically necessary viewpoint (a) operates as (b). (a) cannot even be included in my dialectically necessary viewpoint without being portrayed as (b) (see Beyleveld 1991, 295),

Once this is appreciated, it becomes apparent that, in reasoning from my proactive valuation of my purposes, I am reasoning from *my* possession of the property of rpvp [i.e., my possession of (a)] (which necessarily belongs to all PPAs [i.e., agents]). (Ibid., 296)

In my view, this is the most vulnerable step in the argument to the *PGC*. Thus, if the above argument is sound, the dialectical necessity of the *PGC* appears to be rationally inescapable. This has implications beyond the scope of this book, not least on the relationship between morality and a justifiable concept of law (see Beyleveld and Brownsword 1994). However, since my purpose is to evaluate existing positive legislation and regulations, it is simpler if I treat morality as if it were external to the law as, for present purposes, nothing of significance turns on this issue.

1.3 Dialectically Contingent Arguments for the *PGC*

If a categorical other-regarding principle is to be justified to the rational amoralist, nothing less than logical necessity operating on rationally necessary premises will do. Nonetheless, the idea of deriving a supreme moral principle purely logically from premises that are rationally undeniable by all relevant subjects is not surprisingly an unpopular one.

One theorist went as far as declaring that,

This is "philosophy as a coercive activity," and Gewirth comes quite close to the extreme of propounding "arguments so powerful that they set up reverberations in the brain: if the person refuses to accept the conclusion, he *dies*." (Regis 1984, 2)¹⁶

¹⁶ Regis is quoting Nozick 1981 who was addressing philosophical strategies generally, rather than Gewirth's argument as such.

Others have rejected the methodology as "like trying to squeeze blood out of a turnip" (Nielsen 1984, 79), and so obviously flawed that the reader can be trusted to find its flaws unaided (see Nozick 1981, 722).¹⁷

One supporter of Gewirth's project has adopted an approach that might be more appealing to such critics and presented dialectically contingent justifications for the *PGC*, i.e., dialectical arguments starting from premises that can be meaningfully denied. Beyleveld 1996 presents arguments to show that the *PGC* follows logically from the claim that there are

- (a) human rights;
- (b) categorically other-regarding requirements on action (i.e., moral requirements as defined in 1.1); or
- (c) categorically binding requirements on action.

The point of presenting such arguments is more political than philosophical; it relies on the fact that these premises attract widespread support and are unlikely to be rejected. The relevancy of this approach should be evident. Premise (a), the idea that there are human rights, is one that is entrenched in all the legal systems under study. In all the EU countries, the US, and Canada the idea that humans have rights by virtue of being human is foundational. This is reflected not only in the written constitutions of countries such as the US and France, and the Bill of Rights in countries such as Canada, but also in the common law of countries, such as England. Moreover, all these countries are signatories of various international human rights conventions. The UK has recently made an explicit commitment to securing human rights by giving circumscribed domestic effect to the main provisions of the European Convention for the Protection of Human Rights and Fundamental Freedoms in the Human Rights Act 1998.

Where human rights are taken to be will (or choice) claim-rights commitment to the *PGC* is logically implied.¹⁸ Beyleveld (1996, 23–25) argues that to recognise (will-choice) rights to anything requires one to recognise the necessary means of exercising that right, if one is to avoid contradicting oneself. This requires one to grant rights to the generic features of agency as the necessary conditions for exercising any rights irrespective of their specific content. Also, since only agents can meaningfully exercise a right, agents must be the relevant subjects and objects of these rights. Thus,

¹⁷ To quote,

I leave it to the reader to decide where this attempt to have morality drop out of the category of purposeful action fails. (Nozick 1981, 722)

¹⁸ Beyleveld 1996 does not make the fact that the relevant conception of rights must be the will-choice conception explicit. If human rights are accepted only if defined by the interest/benefit conception, then the argument to the *PGC* will be an argument from duties (i.e., from categorical other-regarding requirements on action).

granting human rights (understood as will-choice rights possessed by virtue of being human) requires one to recognise generic rights of agents.

The soundness of this argument turns on the fact that the capacities necessary to exercise rights (to waive the benefits or burdens of rights) and to be a meaningful subject or object of practical precepts are the attributes of agency.

Of course, the argument from acceptance of human rights will have no persuasive force for those who do not accept the supposition that there are human rights. However, a parallel argument can be presented from acceptance of moral duties; from the supposition that there are categorically binding and other-regarding requirements on one's action (see Beyleveld 1996, 32–35). According to this argument, if I accept that I owe categorical duties to others, then I must claim that I ought to have the necessary conditions of my fulfilling those duties. That is, I must claim rights to my possession of the generic features. Since I owe these duties by virtue of being an agent (which follows from the supposition that these duties are categorical), by the logical principle of universalisability all other agents owe these duties. Thus, all other agents must also claim rights to the generic features. Since these duties are other-regarding, I must accept duties to maintain and advance the generic features of other agents. Universalisation of this leads to the *PGC*.

A slightly weaker conclusion is sought by a similar argument presented by Doyal and Gough (1991, Chapter Five). They invoke the principle "ought" implies "can" to demonstrate that if *B* holds *A* to have any obligations to others, then *B* must accept an obligation to forebear from preventing *A* from doing her duty (i.e., an obligation not to interfere with *A*'s minimal needs) and an obligation "at least to contribute towards *A*'s minimal needs-satisfaction" (ibid., 95). In other words, in Gewirth terminology, they apparently argue that to accept that others owe duties implies acceptance of duties to maintain and advance that other's generic features.

If the dialectically contingent arguments are successful, even if the dialectically necessary argument were not, opponents of the *PGC* are faced with a choice between giving up their opposition to the *PGC* or giving up claims that they are likely to hold dear—such as the claim that there are human rights. Thus, in this sense at least, this book is an attempt to draw out the logical implications of belief in human rights.

1.4 Conclusion

The abstract moral principle discussed above might seem far removed from the ethical and regulatory questions asked at the beginning of this chapter. Indeed it is. This starting point needs considerable expansion and

supplementation before it can be applied to the subject matter of this book. The mere supposition of a moral principle granting rights to the generic features of agency to all agents does not, by itself, tell us much about the morality of the techniques of prenatal influence or how to regulate their use.

This criterion of moral permissibility needs to be developed if it is to be applied to practical problems. The next step is to ask what or whom this principle protects. In Chapter Two, I will argue that this question must be asked with reference to the limitations of possible knowledge. We must face head on what is known as the problem of other minds, i.e., the problem that however much the empirical evidence leads us to believe that other beings have minds, interpreting the evidence in this way requires metaphysical assumptions that we cannot know for certain. It is only against this backcloth that our answers can have practical significance for determining our obligations to objects and beings in the empirical world.

After this moral framework is developed, Chapter Three will outline the ethical and regulatory issues raised by the subject matter of this book. The rest of the book will analyse this subject matter, the techniques of prenatal influence, with reference to the current regulatory position in the 15 member states of the EU, Canada, and the US.

Chapter 2

Moral Status: The Objects of Moral Concern

Before evaluating the morality of existing attempts to regulate the techniques of prenatal influence, it needs to be asked what or who matters morally. We need to ask to what we owe moral concern, where being an object of moral concern involves being owed duties, or to put it another way, involves having moral status.

There are two ways in which a being or object can attract moral status. The first way is for it¹ to attract moral status directly, solely on the basis of its characteristics. I will refer to this as *intrinsic moral status*. The second way is for it to attract moral status indirectly, as a means of protecting the moral status of those (others) with intrinsic moral status. I will refer to this type as *indirect moral status*.

In this chapter, I concentrate on the determination of what or who has intrinsic (or direct) moral status. Nevertheless, the existence of indirect moral status indicates that even if a being has no intrinsic moral status, it does not follow that we can treat it as we like with impunity.

Towards the end of this chapter it will be argued that determining moral status is only the first step towards understanding our moral obligations. The other steps or factors will be analysed.

2.1 Grounds for Possession of Intrinsic Moral Status

Possession of intrinsic moral status can be grounded on possession of a number of characteristics or properties. There are many possible criteria for possession of moral status. Some wish to grant moral status to those who are

- (a) living creatures;
- (b) sentient, i.e., capable of experiencing pain;
- (c) human, i.e., member of *Homo sapiens*;
- (d) agents, i.e., able to act for purposes constituting their reasons for action;

¹ I use the word "it" throughout to avoid implying that those with moral status are necessarily human or gendered.

- (e) partial agents, i.e., non-agents who possess some of the characteristics of agents; *or*
- (f) potential agents, i.e., non-agents who have the potential to become agents.

These are just examples. Each criterion has its supporters and critics. For example, some theological positions wish to ground possession of intrinsic moral status on membership of the species *Homo sapiens* (see, e.g., Noonan 1970); yet others denounce this criterion as a morally repugnant prejudice comparable to racism and sexism (see, e.g., Singer 1995).

Another heavily criticised criterion is that of potential agency or, as it is sometimes phrased, potential personhood/humanity. The major objection to the claim that intrinsic moral status is grounded on potential agency depends on it being formulated as a means of deriving moral protection from the claim that agents have moral status. When formulated in this way, it can be objected that potential qualification for possession of intrinsic moral status cannot serve as a sufficient ground for actual qualification for possession of intrinsic moral status. To use the words of John Harris, "[w]e are all potentially dead, but no one supposes that this fact constitutes a reason for treating us as if we were already dead" (Harris 1998a, 50). This claim, sometimes referred to as the "logical point about potentiality" (see Feinberg and Levenbrook 1993, 206), is indubitably correct. This logical point, however, demonstrates only that the sufficiency of potential agency (for possession of intrinsic moral status) cannot be derived from the sufficiency of actual agency. It does not show that potential agency cannot, with the support of further premises or independently of its relationship to actual agency, be a sufficient ground for possession of intrinsic moral status.

Nonetheless, there are many other criticisms of the concept of potentiality. For example, according to Harris,

if the potentiality argument suggests that we have to regard as morally significant anything which has the potential to become a fully fledged human being, and hence have some moral duty to protect and actualize all human potential, then we are in for a very exhausting time of it indeed. (1998a, 50)

This argument is weaker than it first appears, as it leaves two lines of response. First, we could take advantage of the "if" and develop a potentiality argument that does not impose a duty to protect and actualise *all* potential. Potentiality can be held to be sufficient for granting full moral status, a fixed degree of moral status below this level, *or* moral status that is proportionate to the degree of potential possessed. It does not follow from the fact that a being has some intrinsic moral status that we must protect it no matter what consequences this has for those with greater moral status. To

take just one example, if the potentiality argument operates on the basis of a threshold, counting only those with a certain degree of potential, then we will only have a duty to protect those above that threshold, and then only insofar as this is consistent with our other (potentially hierarchically more important) moral obligations.²

Second, a proponent of the potentiality criterion can always bite the bullet and accept that we are obliged to protect and actualise such potential *insofar as we can*.³ Harris has given no argument why this is wrong in principle, as opposed to being merely counter-intuitive.

Moreover, with regard to this and the other possible grounds for possession of intrinsic moral status, where one is dealing with a categorical moral principle, precautionary reasoning will operate to protect those who might possess the relevant properties. This type of argument will be presented below (2.4) in connection with the moral theory on which the thesis of this book is premised. For now, it is sufficient to note that since the violation of a categorical moral principle is (by definition) absolutely impermissible, and we can never be certain that another being lacks whatever property is held to be necessary for possession of intrinsic moral status,⁴ we must treat all other beings as possessing the relevant property *unless* doing so itself threatens to violate that categorical moral principle.

2.2 Grounds for Possession of Intrinsic Moral Status Underpinning Current Regulation and Debate

Rhetoric capable of simultaneously appealing to more than one criterion for possession of intrinsic moral status is pervasive.

At the international level, rhetoric with widespread appeal peppers international instruments, such as the European Convention on Human Rights and Biomedicine. Article 1 of this Convention demands that parties to it "protect the dignity and identity of all human beings." The World Health Organisation's 1997 resolution adopts similar language,

The use of cloning for the replication of human individuals is ethically unacceptable and contrary to *human integrity and morality*. (Quoted in UNESCO 1998, my emphasis)

² For an example of a threshold argument, whereby only a specific type of potentiality (labelled "strong potentiality") is said to count, see Stone 1987.

³ There is no reason why a proponent of potentiality is committed to denying that "ought" implies "can."

⁴ Simply because of the limitations of empirical knowledge and the logical possibility of innumerable alternative metaphysical explanations for any given set of empirical facts.

Such rhetoric could appeal to those adopting any of the positions outlined above (2.1). All the positions outlined grant full intrinsic moral status to normal adult human beings and the rhetoric used can suggest that what is being protected or referred to is the moral status of adult human beings or the status of human agents as duty bearers. Also, the term "human" ambiguously suggests advocacy of two different views: the view that moral status rests on membership of the human race (i.e., human in the biological sense) and the view that moral status belongs to agents or persons (i.e., human in a moral sense). Although, it must be admitted, the former interpretation is the most persuasive.

The language of national bodies is similarly vague, seeking widespread appeal rather than clarity of position or argument. For example, the published opinions of the Portuguese National Council of Ethics for the Life Sciences are loaded with assertions that science must serve "human life and dignity" (1995, 3), and protect "the dignity of the human person, the equilibrium of the human species and life in society" (1997, 2). Similarly, in the UK, two bodies have vaguely asserted that cloning "raises serious ethical issues, concerned with human responsibility and instrumentalisation of human beings" (HGAC and HFEA 1998a, 16).

Even where the language appears to be committed to a particular stance, further analysis often reveals an underlying vagueness. For example, the Warnock Report, which formed the basis of the UK Human Fertilisation and Embryology Act 1990, asserts that "the embryo of the human species ought to have a special status" albeit less than that of a living child or adult (Warnock 1985, para. 11.7). This reference to "the human species" suggests advocacy of the view that intrinsic moral status is grounded in membership of the human race, but special status for the human embryo could plausibly be derived from potential agency or even indirect considerations. This latter point highlights the danger of looking at the national and international debate for insight into the criterion for possession of intrinsic moral status in play.⁵ This danger is even more evident when analysing different regulatory structures. There are of course exceptions—Ireland appears to have adopted the Roman Catholic Church's position grounding moral status on being human in the biological sense (see 4.3.2). However, in the main, analysing different regulatory approaches is unlikely to reveal the level of intrinsic moral status granted, or to what it is granted, because beings might be protected as a means of protecting the intrinsic moral status of others. Legislation might protect the embryo because it is thought to possess a high degree of intrinsic moral status *or* because the embryo is thought to have a

⁵ Many other examples could be cited. E.g., the now customary nod in the direction of "human dignity," is another rhetorical device used to reach agreement by hiding the true nature of dissensus and disagreement (see 6.3).

high degree of indirect moral status (e.g., it might be protected as a means of protecting the moral interests of adult humans).

Moreover, any political consensus or regulatory approach is more likely to be the result of political compromise than the adoption of a theoretically pure perspective. Indeed, a regulatory approach is more likely to tell us about the compromises made or evaded than about the underpinning ground for possession of intrinsic moral status (see Beyleveld and Pattinson 2000b, 255–258).

This does not, however, mean that there is no way to determine the level of intrinsic moral status a being possesses. The absence of political consensus has no relevance to the determination of who has moral status at the level of principle.⁶ Morality, as defined in Chapter One, comprises a set of categorical other-regarding obligations the existence of which is not dependent on their recognition as such. Since my argument is premised on the claim that it is necessarily true that an agent denies that it is an agent if it fails to accept and act in accordance with the *PGC*, reliance on consensus, intuition, or alternative moral perspectives is to be rejected.⁷ If the acceptance of this conclusion strikes the reader as being unduly dictatorial, or lacking moral appeal, this can only be because a prior moral framework is being implicitly appealed to.

2.3 To What Does the *PGC* Grant Intrinsic Moral Status in the *Abstract*, as Part of Its Ontology?⁸

As just restated, Alan Gewirth demonstrates that agents and prospective agents (hereafter "agents") are committed to accepting the *PGC* on pain of denying that they are themselves agents. There is no contingency in starting with the concept of an agent. Agents are, quite simply, the only beings for which questions as to what one ought to do can have meaningful import. The abilities necessary to be the meaningful object or subject of a moral imperative (or any practical precept) are the abilities of agency. Unless one is able to reflect on one's ability to act for purposes constituting one's

⁶ Cf. the following statement of the (Canadian) Discussion Group on Embryo Research.

The pluralistic nature of Canadian society does not allow for a settled definition of the moral status of the embryo . . . The human embryo by virtue of their [sic] humanness has a certain moral status and, therefore, should be treated with respect. (1995, 1)

⁷ The only alternative is to reject the premise of this book, the *PGC*, which requires refutation of the arguments that have been presented elsewhere to defend this premise (see 1.2.2).

⁸ The following argument is derived from Beyleveld and Pattinson 1998 and 2000a.

reasons for acting, one is not able to be the object or subject of practical precepts in any meaningful sense.

Since the *PGC* requires agents to act in accordance with the "generic rights" of other agents, it should be quite clear that the *PGC* grants intrinsic moral status to agents. It is, however, debatable whether this moral principle grants intrinsic moral status, as part of its ontology, to any other beings (see, e.g., Hill 1984; Gewirth 1984; Pluhar 1995, ch. 5).

Gewirth himself maintains that the *PGC* grants moral status to various beings that he classifies as non-agents, such as young children, the mentally deficient, fetuses, and non-human animals (see Gewirth 1978, 121–124; 140–145). He argues that the "Principle of Proportionality" operates to extend the population to which the *PGC* applies in the abstract to encompass those who have only some of the characteristics necessary for agency—*partial agents*.

The principle Gewirth claims is able to effect this derivation, the Principle of Proportionality, states,

When some quality Q justifies having certain rights R, and the possession of Q varies in degree in the respect that is relevant to Q's justifying the having of R, the degree to which R is had is proportional to or varies with the degree to which Q is had). . . . Thus, if x units of Q justify that one have x units of R, then y units of Q justify that one have y units of R. (Gewirth 1978, 121)

As stated in Chapter One, in the process of deriving the *PGC* it is demonstrated that agents must (on the pain of denying that they are agents) consider being an agent as the sufficient condition for possession of all the generic rights. Thus, the claim that partial agents have the generic rights in part requires the substitution of "being an agent" for Q, and "the generic rights" for R in the Principle of Proportionality. In short, what Gewirth wishes to do is use the Principle of Proportionality, together with the *PGC*, to infer that as a being approaches agency it is accorded proportionally greater generic rights. Thus, he argues, agents have the generic rights in full—all the generic rights at full strength—whereas partial agents have the generic rights in part—limited generic rights of comparatively weaker strength.⁹

However, even if the Principle of Proportionality is reformulated so that it becomes a necessarily true principle (maintaining the rational necessity of its import for agents),¹⁰ there are a number of reasons why the ontology of

the *PGC* cannot be changed *solely* by its application. Three such reasons demonstrate that having the capacities necessary and sufficient to be an agent is *necessary* (and sufficient) for having any generic rights at all. First, the generic rights, by virtue of their derivation, are will/choice claim-rights, which (as they presuppose the ability to waive the benefits of the rights) can only meaningfully be possessed by agents. Second, since the subjects of the generic rights are also the objects of correlative duties, the imposition of proportional generic rights implies the imposition of proportional duties, and partial agents cannot meaningfully be the subjects of duties to any degree. Third, the force of these objections cannot be evaded by claiming that the Principle of Proportionality can be used to derive intrinsic moral status for partial agents in the form of "quasi-generic rights," i.e., benefit/interest claim-rights, the benefits of which are not waivable. This is simply because the Principle of Proportionality is a quantitative manipulator so that it can only (*acting on its own*) alter the quantity of a variable, rather than the quality of a variable. In other words, the Principle of Proportionality cannot (without the assistance of another principle) derive quasi-generic rights from a claim about generic rights.

I have argued that the *PGC*, *in the abstract*, grants intrinsic moral status to agents, but not (at least by application of the Principle of Proportionality alone) to partial agents. But what about *potential agents*, i.e., those non-agents who have the potential to become agents?

Gewirth and Steigleder wish to derive moral status for potential agents by modifying the ontology of the *PGC*. Gewirth (1978, 142) sees this as an application of the Principle of Proportionality, whilst Steigleder (1998, 241–242) appears to derive intrinsic moral status for potential agents conceptually from the concept of potentiality itself.

There is, however, a fatal objection to attempts to derive intrinsic moral status for potential agents under the *PGC* (see Beyleveld and Pattinson 2000a, 46–49). For any being (X) to be granted direct protection under the *PGC* it must be demonstrable that agents must (on the pain of denying that they are agents) grant X at least some moral worth by virtue of X's

degree in the respect that is relevant to having Q's justifying the having of R, then the degree to which R is had is a *function* of the degree to which Q is had. Nonetheless, it cannot be inferred from this (without further provisos) that having R is *such* a function of having Q that, if having x units of Q justify that one have x units of R, then having y units of Q justify that one has y units of R for *all* values of x and y.

Also, since R can be any property at all, the Principle of Proportionality can be stated more explicitly as,

When having some quality Q justifies having some property R, and the extent of having Q sufficient to justify having R in full is not necessary to justify having R to any extent at all, the degree to which R is had is a function of the degree to which Q is had. (Beyleveld and Pattinson 2000a, 46)

⁹ See, e.g., Gewirth 1978, 121–124 and 140–145; analysed in more detail in Beyleveld and Pattinson 1998 and 2000a.

¹⁰ The Principle of Proportionality, as stated by Gewirth, is not a necessarily true principle (see Beyleveld and Pattinson 1998 and 2000a, 46). However, it is necessarily true that, if having Q justifies having R, and the possession of Q varies in degree in

characteristics. In other words, an agent must deny that it is an agent by denying that potential agency is a sufficient reason for possession of intrinsic moral status.

But an agent cannot deny that it is an agent by refusing to accept that possession of a property *it cannot possibly possess* is sufficient for some intrinsic moral status. Additionally, an agent cannot (by definition) be a potential agent where a potential agent is understood to be a non-agent possessing the potential to become an agent. Thus, being a mere potential agent cannot possibly be a sufficient reason for the conferment of any direct moral protection under the *PGC*.

It also follows from this line of reasoning that an agent cannot deny that it is an agent by refusing to accept that possession of a property not necessarily possessed by agents (as opposed to not possibly being possessed by agents) is sufficient for some intrinsic moral status. Thus, we can say that those beings that are not at least partial agents cannot possibly be granted intrinsic moral status under the *PGC*.

In summary, the *PGC* definitely grants intrinsic moral status to agents, does not appear to grant any intrinsic moral status to partial agents (it certainly cannot grant such protection to partial agents by the mere application of the Principle of Proportionality), and cannot grant intrinsic moral status to potential agents or beings that are not at least partial agents.

2.4 To What Does the *PGC* Grant Intrinsic Moral Status in Practice, as Part of Its Application to the Objects in the Empirical World?¹¹

It appears that the *PGC* grants intrinsic moral status, in the abstract, only to agents. Thus, if we are going to apply the *PGC* to objects in the empirical world we need to be able to determine who, or what, are agents.

As defined, being an agent involves having a specific kind of mental attitude—it involves having the reflective, purposive capacity of proactively valuing one's purposes. Thus, since I (any agent) have direct access to my mental state, I can know with certainty that I am an agent. I cannot even doubt my own possession of the requisite self-reflective purposivity without thereby demonstrating that very thing, because the very act of denying that I have self-reflective purposivity involves acting for the reflective purpose of denying that I have this capacity.

I cannot, however, know that any other being is an agent in this way. I do not have direct access to the mental state of another being. I cannot, therefore, necessarily presuppose the agency of others by denying it. At most, I (any agent) can try to determine whether some other being "X" is an

agent by constructing a model of the characteristics and behaviour to be expected of an agent, and testing X's characteristics and behaviour against it. However, even if X displays all the characteristics and behaviour expected of an agent (as most adult human beings do), we can only say that it is *ostensibly* an agent (hereafter an *ostensible agent*). It remains logically possible that X is merely a cleverly programmed automaton without a mind.

In another context Feinberg and Levenbrook claim,

What makes me *certain* that my parents, siblings, and friends are people [in the above terminology, agents] is that they give evidence of being conscious of the world and of themselves; they have inner emotional lives, just like me; they can understand things and reason about them, make plans, and act; they can communicate with me, argue, negotiate, express themselves, make agreements, honor commitments, and stand in relationships of mutual trust; they have tastes and values of their own; they can be frustrated or fulfilled, pleased or hurt. (1995, 201, my emphasis)

Despite Feinberg and Levenbrook's reassurances, we can never be *certain* that Descartes' evil demon is not deceiving us by projecting appropriate behavioural patterns into our minds or by programming the objects that we perceive. The relevance of empirical evidence for determining whether another being is an agent depends on metaphysical assumptions.

Thus, a sceptic might claim that although the *PGC* is categorically binding on *agents*, it cannot be demonstrated (to any agent) with the required degree of rational stringency that there are any other agents. Without such rational demonstrability, the *PGC* is rationally necessary for agents only in an abstract way, divorced from our actions in the empirical world.

There are a number of contingent ways of responding to the sceptic (see Beyleveld and Pattinson 2000a, 41–42). However, what we need is a reason that is rationally compelling for agents for accepting that (or acting as if) other agents exist. This reason is provided by the application of precautionary reasoning to the categorically binding nature of the *PGC*.

It can be conceded that where X is an *ostensible agent* (i.e., displays all the characteristics and behaviour expected of a being with the capacity for reflective purposivity) the propositions "X is an agent" and "X is not an agent" have the same epistemic/cognitive status. That is to say, it can be conceded that it is logically possible for either proposition to be true (though not in the same sense at the same time). However, the *PGC* imposes a framework for interpreting these propositions, because these propositions have significantly divergent moral import. If I mistakenly presume X to be an agent, then, although this will lead me (mistakenly) to have to restrict my exercise of my rights to some extent, I do not deny my (or any other agent's) status as a rights-holder. In contrast, if I mistakenly presume X not to be an agent, then I deny X (an agent) is a rights-holder. In short, the consequences

¹¹ The following argument is in part derived from Beyleveld and Pattinson 1998 and 2000a.

of being wrong in one case involve restricting the exercise of my rights, and the denial of all the rights of a right-holder in the other.

Therefore, all things being equal, presuming that X is an agent runs far less risk of violating the *PGC* than presuming that X is not an agent. Since the *PGC* is categorically binding, it can never be justifiable to run the risk of violating it where this can be avoided. Therefore, it is categorically necessary to do whatever one can to avoid denying the agency of others, provided only that the actions taken do not conflict with the hierarchically more important requirements of the *PGC*.

Where X is an ostensible agent it is, by definition, possible to treat X as an agent possessing the generic rights. It follows that I can avoid the risk of mistakenly denying the intrinsic moral status that X might have altogether by presuming X to be an agent and acting accordingly.

Thus, except where I am faced with an unavoidable conflict between the hierarchically most important generic needs of myself and an ostensible agent,¹² I must totally ignore the metaphysical possibility that X might not be an agent. X's ostensible agency is to be taken as sufficient evidence that X has the capacities needed to be an agent.

As stated elsewhere, this reasoning invokes a Precautionary Principle,

If there is no way of knowing whether or not X has property P, then, insofar as it is possible to do so, X must be assumed to have property P if the consequences (as measured by the Principle of Generic Consistency) of erring in presuming that X *does not have* P are worse than those of erring in presuming that X *has* P (and X must be assumed to *not have* P if the consequences of erring in presuming that X *has* P are worse than those of assuming that X *does not have* P). (Beyleveld and Pattinson 2000a, 43)

What about those beings and entities—such as gametes, embryos, fetuses, or newborn children—who do not display *all* the characteristics and behaviour expected of an agent? Although they display some related characteristics and behaviour,¹³ the evidence persuasively suggests that they are not agents.

¹² This exception will only apply in extreme circumstances (such as where two men are both trying to hang on to a piece of wood that will not support both their weights after a shipwreck). It is important to note that the conflict must be (a) *unavoidable*, so that the proviso does not apply where I am responsible for the occurrence of the conflict in the first-place; and (b) a conflict over the most *basic* generic needs, i.e., the consequences of my not treating the other as an agent must involve irreparable damage to my ability to act at all. See 4.2. for further discussion of this reasoning.

¹³ Spermatozoa, e.g., are alive and, during the fertilisation process at least, behave in ways that are vaguely goal-orientated; albeit more suggestive of biochemical hardwiring than a rational will. An even greater degree of partial agency is displayed by newborn babies who also display some ability to interact with, and learn from, their surroundings.

They cannot even be treated as agents with the generic rights in the same way that ostensible agents can, as they do not display the ability to exercise the generic rights (the benefits of which are waivable), or to act in accordance with the generic rights of others.

Nonetheless, I cannot be certain that these are not in fact agents. It remains possible—though admittedly counter-intuitive and not at all likely—that a being or entity who does not display ostensible agency is in fact an agent. A failure to display ostensible agency does not conclusively prove that a being is not an agent. So, if I suppose it is not an agent and act accordingly, I could thereby be depriving it of the protection of the *PGC* to which it is entitled.

We cannot avoid denying the possible intrinsic moral status of such a being *altogether*, because we cannot meaningfully treat it as an agent with the generic rights. We can, however, grant (necessarily paternalistic) “duties of protection” to those who appear to be only partial agents. Such duties require agents to assist and refrain from harming such beings in ways that protect the benefits that they would receive if they had the generic rights and chose to exercise them. In short, we must grant what appear to be only partial agents duties of protection, as this is the only way of avoiding violating their moral rights, should they in fact be agents.

Where does this leave us if we are faced with a conflict between two such beings? Well, precautionary reasoning explicitly declares that I must treat all possible agents as agents except where this threatens to violate the more important requirements of the *PGC*. Thus, all things being equal, such conflicts are to be handled by a criterion of avoidance of more probable harm, which states,

“If my doing y to Z is more likely to cause harm h to Z than my doing y to X (and I cannot avoid doing y to one of Z or X) then I ought to do y to X rather than to Z.”

Where y = failing to observe a particular duty of protection, and h = mistakenly denying a being the status of an agent, we can infer by this criterion that, “If my failing to observe a particular duty of protection to Z is more likely to mistakenly deny Z the status of an agent than is my failing to observe this duty of protection to X (and I cannot avoid failing to observe this duty to one of Z or X) then I ought to fail to observe my duty to X rather than to Z.” (Beyleveld and Pattinson 2000a, 44)

Thus, my duties of protection to those who are more probably agents take precedence over my duties of protection to those who are less probably agents. In other words, the moral protection granted to those who are apparently partial agents is *proportional* to the probability that they are agents.

In summary, all things being equal, all possible agents are to be treated as agents insofar as it is possible to do so. However, where there is a conflict between the protections offered to two possible agents, ostensible agents are to be granted full intrinsic moral status and what are apparently only partial agents must be granted intrinsic moral status that is proportional to the probability that they are agents.

2.5 Relevant Empirical Evidence

We have seen that the level of a being's intrinsic moral status is dependent upon the probability of it being an agent (up to the point of ostensible agency where we must grant full moral status). Therefore, applying the *PGC* to the objects in the empirical world requires an understanding of what is to count as relevant evidence affecting the likelihood that a being is an agent. Viewed through the interpretative gauze of precautionary reasoning, there are at least three categories of evidence relevant to the probability of any being (Y) being an agent.

First, there is behavioural evidence. This is evidence related to the way Y behaves, and the relationship between this behaviour and the behaviour that an agent would be expected to display. The behaviour that living beings are capable of exhibiting can be classified in a number of ways. Elsewhere four categories of evidence are suggested:

- I Patterned organismic behaviour (displayed by all living organisms).
- II Behaviour that evidences itself as purposive (as being motivated by feeling or desire).
- III Behaviour that evidences itself as intelligent (as being susceptible to learning by experience).
- IV Behaviour that evidences itself as rational (value-guided, and characteristic of an agent). (Beyleveld and Pattinson 1998, 18–19)

Category IV behaviour constitutes ostensible agency, which is sufficient to attribute possession of full intrinsic moral status. Those whose behaviour is restricted to Category I are to be accorded less moral status, because this behaviour is not sufficient for ostensible agency. As beings acquire Category II and III behaviour, however, they are to be accorded progressively greater moral status, because such a progression provides increasingly better evidence of their status as agents.

These categories are neither watertight nor invariable, so that there is in fact a proportional range of evidence within each category. Since this book deals primarily with the moral claims of normal adult humans (who are, paradigmatically, ostensible agents) in relation to the moral claims of those displaying behaviour falling within Category I (and, perhaps, sometimes

Category II) there is no need to analyse this type of evidence to any greater degree here.

Second, a being's characteristics count as evidence affecting the probability that it is an agent. For example, if a specific degree of development of the brain and nervous system is empirically associated with the ability to express pain behaviour, making it likely that any being with such characteristics is able to feel pain, this counts as agency-related evidence in the same way that pain-behaviour would do.¹⁴ In a way, evidence concerning a being's characteristics is indirect behavioural evidence. It is the type of evidence that we habitually use when encountering an unknown member of a familiar species. For example, we assume on the basis of the characteristics possessed by an unknown human that it has the degree of abilities that we associate with humans of the same age and condition, unless and until we acquire conflicting evidence. Under precautionary reasoning this is precisely what we ought to do.

Thus, the intrinsic moral status of a developing fetus will be proportional not only to its behavioural display of the abilities related to ostensible agency (which, given its environment will be limited), but also its characteristics, such as the degree of development its organs and nervous system display.

Third, evidence of future potential agency-related behaviour and characteristics (particularly evidence of potential ostensible agency) is relevant evidence. On the one hand, evidence that Y is a potential ostensible agent, *by itself*, increases the likelihood that Y is in fact an agent, in proportion to the strength of this evidence. On the other hand, evidence that Y is a potential ostensible agent adds to the degree of moral status secured by the degree to which it displays the characteristics and behaviour expected of an agent. Thus, where there is a conflict between what appear to be two partial agents (A and B), both displaying the same degree of characteristics and behaviour expected of an agent, the one displaying the greater degree of potential ostensible agency will have greater intrinsic moral status.

The weakest evidence that a being is a potential ostensible agent will exist where it is a member of a species whose members typically develop into ostensible agents under specifiable conditions. Thus, *ex hypothesi*, a human embryo exhibits evidence of potential ostensible agency (in proportion to its developmental stage), thereby increasing the moral status it possesses over that of, say, a sheep embryo at the same stage of development.

In summary, where a being displays characteristics and behaviour less than that expected of an ostensible agent its moral status will be

¹⁴ All things being equal, a being displaying pain-behaviour (i.e., reaction to pain) is more likely to be an agent than a being unable to react in this way to such external stimulus.

proportionate to the probability that it is a locked-in agent, i.e., an agent that is for some reason unable to display its agency to others. The probability that a being is a locked-in agent is to be measured by evidence relating to the degree of behaviour and characteristics (related to those displayed by ostensible agents) it displays, and any evidence suggesting that it will potentially increase its agency-related behaviour and characteristics in the future.

2.6 The Effect of Indirect Moral Status

As indicated at the outset, a being might be protected not only because its own characteristics are sufficient to grant it moral worth, but also because of its connection to others who have such intrinsic moral worth. Indirect (derivative or vicarious) moral status can be acquired in two ways.

First, there is a form of self-connected indirect protection,¹⁵ which is not a pure form of indirect moral status at all. As I will explain below, for a being to be granted moral status in this way, it must be a potential (ostensible)¹⁶ agent treated in a way manifesting an intention on the part of the actor that it will become an agent-in-the-future. If these conditions are satisfied, then the possible agent must be treated in a way consistent with the generic rights that it will have when it becomes an agent in the future. Thus, the possible agent now has a conditional form of moral status. It has a form of self-connected indirect moral status.

Second, a being might be granted wholly indirect moral status, i.e., moral status as a means of protecting the intrinsic moral status of a totally independent being. To limit overlap with other chapters, I will do no more than outline the various ways in which a being might attract such protection.

2.6.1 Indirect Self-Connected Protection: Protection of a Being as a Means of Protecting It as a Future Ostensible Agent

Protection of a being as a future possessor of intrinsic moral status is often confused with the protection granted to a being as a *potential* possessor of intrinsic moral status. These concepts—the concepts of futurity and potentiality—must be kept distinct.

¹⁵ This label is taken from Beyleveld 2000a, 64. For further analysis of this concept, the concept of futurity, see below; Beyleveld, Quarrell, and Toddington 1997; and Pluhar 1995, 111. Futurity is also mentioned, elliptically, in various other works, including Harris 1998a, 63–64; and Feinberg 1978, 180–182.

¹⁶ For ease of expression I will drop the prefix “ostensible,” unless it requires particular emphasis.

One theorist who does distinguish the two is Pluhar, who argues that the protection offered by the futurity argument

is based upon the hypothetical existence of future rights holders into which these infants [or other potential agents]¹⁷ have turned. *But if we decide to exploit any of these infants [or other potential agents] in ways that would prevent them from ever achieving the status of rights holders, no wrong would be done! If we significantly impair them mentally, or kill them, no future rights holders can have any claim on us.* (Pluhar 1995, 111, original emphasis)

On the assumption that a potential agent has no intrinsic moral status, Pluhar argues that it will only attract protection as a future agent if it is treated in a way that allows it to actually develop into a future agent. This is undoubtedly true. Nevertheless, where my actions display an intention that a potential agent will become an agent-in-the-future, then when evaluating my actions, this potential agent must be treated as an agent-in-the-future. Consequently, the futurity argument still has force in determining my moral obligations. This is so even on Pluhar's assumption that (what appears to be) a potential agent has no intrinsic moral status. For example, if a pregnant woman intends to nurture her child until it reaches the stage of being a possessor of intrinsic moral status (e.g., she does not intend to have an abortion or commit infanticide), she might well be infringing the rights that the embryo-fetus¹⁸ will have as a future agent if she harms it during its gestation (e.g., by excessive alcohol consumption during her pregnancy).

The futurity argument is, however, even stronger than this, because (what appears to be) a potential agent has intrinsic moral status by virtue of the characteristics it currently possesses. Indeed, the *PGC* will (with certain provisos) impose the intention to nurture a potential agent into an agent.¹⁹ Precautionary reasoning requires agents to accept duties to allow and assist a being to develop its potential to display itself as an agent (should it be an agent),²⁰ unless there is a danger of conflict with the protection owed to those of equal or higher moral status. Thus, unless outweighed by other *PGC*-based considerations, we are required to take account of the generic rights that a potential agent will possess in the future.

¹⁷ For convenience I refer to beings that appear to be potential agents as potential agents.

¹⁸ As in the rest of this book, I use the term “embryo-fetus” to encompass all stages of development from fertilisation/creation to birth.

¹⁹ Remember, I am using “agent” as shorthand for “ostensible agent.”

²⁰ This is quite simply because all beings are possible agents, and agents have additive rights to increase their current level of purpose-fulfilment.

2.6.2 Wholly Indirect Moral Status: Protection of a Being as a Means of Protecting Wholly Separate Agents

There are numerous ways in which protecting the interests of a being with intrinsic moral status might require duties to be imposed on others having the effect of protecting those lacking this degree of intrinsic moral status. I will briefly overview five possible arguments granting wholly indirect moral status to a being (X).

It should be noted that where X is an ostensible agent it has full intrinsic moral status. This means that it has the full amount of moral protection possible, so it cannot gain additional moral protection indirectly. Therefore, X needs be taken to be a being displaying insufficient evidence of agency to be classified as an ostensible agent.

Possibility One: The Physical Proximity Argument

Where X is in such close physical proximity to an agent that any attempt to harm X will inadvertently or unavoidably harm (or put at risk from harm) that agent, X must be granted at least a degree of indirect protection. This type of argument provides another reason why a future father's attempt to manipulate the characteristics of his offspring developing in his partner's womb, would be immoral without his partner's consent. The physical proximity between the gestational embryo-fetus and its mother is such that the mother's permission will usually be required before any procedures affecting the embryo-fetus can be undertaken.

Since, however, the embryo-fetus also has some intrinsic moral status, the mother will (in some circumstances) be required to permit or perform certain actions in the embryo-fetus' interests. For example, if she can prevent it developing a seriously debilitating congenital defect by taking certain vitamin supplements that will not harm her health in any way, she will have a duty to (at least) attempt to take these vitamins.²¹

Possibility Two: Argument from Development of Virtues (e.g., Against Brutalisation)

All things being equal, the PGC requires agents to develop virtues, understood as those character traits disposing agents towards compliance with the PGC (see Gewirth 1978, 332–333). Thus, insofar as disregard for the well-being of X is evidence of a cruel character (e.g., one likely to inflict pain or suffering on agents or discriminate between subgroups of agents) it violates the PGC.

²¹ This example is not entirely hypothetical, see 3.4.3 for evidence suggesting that taking folic acid can reduce the chances of a child being born with, *inter alia*, spina bifida.

This type of indirect protection has its origins in the work of Kant who, with regard to the moral status of animals, wrote,

If he is not to stifle his human feelings, he must practise kindness towards animals, for he who is cruel to animals becomes hard also in his dealings with human beings. (Kant 1798 as translated by Infield 1963, 239)

This type of argument is not refuted by examples of persons who can be cruel to one group of possible agents (humans) while simultaneously showing great kindness towards another (non-human animals) (cf. Pluhar 1995, 91). Possibility Two is meant to be generally true rather than true for all individuals, so isolated counter examples do not refute it (nor is anecdotal evidence enough to confirm it).

When reviewing the strength of this argument is must also be remembered that any discriminatory capacity must accord with the requirements of the PGC operating under precautionary reasoning, which will not permit any wanton cruelty to any category of possible agent.

It is arguable that at a certain stage of development the embryo-fetus has so many of the visual features of a human adult or child that it is likely (*though this requires empirical proof*) that those who are able to treat them as worthless objects are more likely to treat adult human beings in this way.

Given the precautionary thesis, agents ought to inculcate themselves with those character dispositions encouraging protection of all possible agents. Such dispositions might even give greater protection to the subjects of prenatal influence than they are currently entitled to by reducing the circumstances where there is conflict between these subjects and the potential parents.

Possibility Three: Argument from Protection of the Sensitivities of Others

Where an agent has protective feelings towards X, harm to X is capable of causing harm to that agent. This is particularly relevant as many human agents have protective feelings towards unborn children. Moreover, as Beyleveld argues,

There is an evolutionary explanation for this, as it is quite plausible that protective feelings for the young, including the unborn, confer an evolutionary advantage. Consequently, to show disregard for the well-being of the embryo-fetus is to cause great distress, even psychological damage to those who have natural, and indeed generally beneficial emotional responses. (2000a, 64)

It has been suggested that the force of this type of argument is removed where the sensitivities of agents are protected by secrecy, so that others

never discover that harm is being inflicted on X (see, e.g., Pluhar 1995, 102). However, secrecy in such circumstances stands in need of justification, as protective feelings for (apparently) partial agents are to be encouraged as a means of inculcating *PGC*-directed dispositions (see Possibility Two, above). Also, it is implausible to suggest that secrecy can always be maintained in such circumstances.

It should, however, be noted that protecting an agent's sensitivities is required by the *PGC* only as a means of protecting its generic features,²² and only when these sensitivities are themselves consistent with the requirements of the *PGC*, including the requirement to treat all agent subgroups as agents.

Possibility Four: Contractual Argument from the Collective Waiver of the Freedom to Mistreat Certain Beings

Since the generic rights are will/choice claim-rights, agents may waive their benefits. This suggests that a collective waiver of the benefit of any right to harm X (should any such right exist) could grant X indirect moral status. There are a number of problems with this form of protection. Evidently those who would wish to harm X are likely to be those who would not agree to waive the benefit of their right (should they have such a right) to do so. Thus, the force of this argument is coterminous with the legitimacy of using democratic mechanisms to override the rights of minorities. Therefore, any limitations on the legitimacy of democracy constrain this form of indirect moral protection.

Possibility Five: Property Argument

Once a proprietary relationship with a particular being or object has been established,²³ harm inflicted on it by others will be an infringement of the owner's rights. Thus, it might appear that X will be granted indirect moral protection if X is the property of an agent. If this were the case, the practical limitations of this indirect protection would be stark; by itself it only protects property and it does not prevent mistreatment by the owner.

²² The generic features are the categorical needs of agency, i.e., those capacities required to act or act successfully, *whatever one's purpose might be*.

²³ There are numerous ways to establish property in an object. Generally, I (any agent) must claim property in whatever is necessary (given the societal and environmental context in which I act) to pursue and defend my having the generic features of agency. One specific method of property acquisition is presented in Gewirth (1996, 166–213). Gewirth justifies private property using “antecedentialist” and “consequentialist” justifications, to show that I have property in whatever income or produce I have legitimately produced for the purpose of having such rights, subject to the rights (particularly positive rights) of others.

With regard to the subjects of prenatal influence the property argument appears weak, since these subjects are, *ex hypothesi*, to be treated as possible agents possessing intrinsic moral status. No agent can legitimately claim ownership rights over another (without that other's consent), as this is tantamount to slavery. At most an agent can claim guardianship rights, but such rights will neither imply a right to harm X,²⁴ nor grant X any additional indirect moral protection from anyone other than, perhaps, the guardian.²⁵

2.7 The Content of Our Moral Obligations

I have argued that under the *PGC* agents are required to grant full intrinsic moral status only to agents, which in practice, requires agents to grant equal generic rights to all those whose characteristics and behaviour are indicative of self-reflective purposivity. Since just about all adult human beings display this degree of agency-related behaviour, the vast majority of potential users of the techniques of prenatal influence will have full intrinsic moral status.

Where the characteristics and behaviour of a being are less than sufficient for ostensible agency, it has moral status though less than that of an ostensible agent (i.e., moral status that is proportional to the likelihood that it is in fact an agent). A being with a low level of moral status might be granted additional protection by more indirect means. For example, a gamete—which displays less agency-related behaviour and characteristics than a bacterium, and an extremely low degree of potential ostensible agency—might be owed additional protection where harm to it is likely to cause psychological harm to the ostensible agent whose body produced it.

However, determining our moral obligations requires more than just an understanding of the level of moral status possessed by those (actually or potentially) affected by our actions. The specific content of our moral obligations will depend on

²⁴ Except where the infliction of a degree of harm to those under one's guardianship is justified under the *PGC*. Where, e.g., the harm is justified as a necessary means of inculcating those under one's guardianship with dispositions and understanding conducive to compliance with the *PGC*.

²⁵ Guardians might, by virtue of assuming responsibilities of guardianship, have special obligations to those in their charge.

It is, however, possible to envisage circumstances where making a property claim over a possible agent might represent the only means, in the circumstances, of protecting its generic features. E.g., in a legal system (such as that of the UK), where an unimplanted embryo has very little (if any) legal status, granting its biological parents limited property rights *might* be an appropriate means of offering embryos some protection.

- (a) the purposes that we are able to perform;
- (b) the magnitude of morally relevant harm threatened (taking account of all morally relevant needs) by our pursuit or non-pursuit of these purposes;
- (c) the risk of morally relevant harm (taking account of all morally relevant needs) resulting from pursuing or not pursuing these purposes; and
- (d) the level of moral status owed to those that we put at risk from this level of harm.

These variables will interact so that for every action there is a need to weigh the risk of *PGC*-relevant harm, taking account of the *PGC*-relevant needs of all potentially affected beings.²⁶

The level of moral status owed to those potentially affected by our conduct (requirement (d)) has already been addressed. Requirement (a) states no more than our moral obligations depend on the alternatives available to us. Obviously, if one potential action will involve harm to myself and morally relevant others, and the only alternative action will involve harm to no one, then I ought to pursue the latter. Our moral obligations are also limited by the principle "ought implies can." That is to say, we cannot be morally required to do anything that is impossible for us to do. This is relative to the degree to which we are able to control our actions in the circumstances (our specific task competence),²⁷ our physical and psychological constitution, and the aid and resources available to us.

The risk of morally relevant harm resulting from our conduct (requirement (c)) requires a measure of the probability that any given action or inaction will cause harm to the morally relevant needs or interests of myself and/or others. This will be contingent on factors such as the particular task being pursued or left unpursued, the specific task competence of those involved, and the resources available. Usually the greater the risk, the more pressing the need to take precautions against its manifestation and *vice versa*. The permissibility of running a risk will be closely tied to other factors, such as the level of morally relevant harm threatened.

The level of harm threatened by our conduct (requirement (b)) is measured by a number of sub-factors. This is determined by the degree to which the morally relevant interests and needs of all those possessing moral status are affected by the specific act/omission in question.

Under the *PGC* the relevant interests are an agent's possession of the generic features of agency, i.e., those capacities necessary for present and future purpose-fulfilment, *whatever that purpose might be*. Actual or threatened damage to an agent's generic features—generic harm—being a prerequisite for *PGC* prescriptions. Gewirth himself separates the generic

features into freedom and well-being, representing their procedural and substantive components respectively. I do not adopt this distinction because it can cause confusion of the aspectual with the perspectival. That is to say, this sub-division increases the likelihood of confusion between freedom and well-being as different aspects (or parts) of the generic features, rather than different perspectives on the same generic features. The point is that freedom and well-being must be interpreted perspectivally, because these are not two different generic features that can come into conflict with each other, but two perspectives on the same corpus of generic features.²⁸

The generic features can be sub-divided into those capacities necessary to act at all, and those necessary to act successfully. Gewirth refers to the capacities necessary to act at all as "basic" capacities. The capacities necessary for successful action can be further divided into the capacities necessary to maintain one's current level of purpose-fulfilment ("nonsubtractive" capacities), and those necessary to increase one's current level of purpose-fulfilment ("additive" capacities). This creates a hierarchy of potential generic harm according to the degree that the relevant generic capacity is needed for purpose-fulfilment. This leads Gewirth to the conclusion that the degree of generic harm/need is measured by the "criterion of degrees of needfulness for action" (see Gewirth 1996, 45–46). Thus, when ranking the rights of agents to the generic features—the "generic rights"—the rights pertaining to generic capacities that are more needed for action take precedence over rights pertaining to less needed generic capacities. In a situation of conflict the generic capacities are to be ranked hierarchically in descending order: basic, nonsubtractive, then additive generic capacities.

Although actual or potential damage to an agent's generic features is a prerequisite for harm under the *PGC*, not all such damage violates the *PGC*. Agents do not have unconditional duties of non-interference or assistance with regard to the generic features of other agents. For example, the duty to aid another agent to secure its generic features is limited by two other provisos (see 1.2 above; Gewirth 1978, 217–230). According to the first, the "own unaided effort" proviso, I (any agent) have a duty to aid another agent to secure its generic features *only* where it is unable to do so by its own unaided effort. The second, the "comparable cost" proviso, states that I only have a duty to aid another agent to secure its generic features when my doing so does not deprive me of the same or more important generic capacities, as measured by the degree of needfulness for action.

²⁶ How these are to be weighed is considered in later chapters, particularly Chapter Five.

²⁷ For a detailed discussion of the concept of "specific task competence," see Beyleveld and Pattinson 1998. See also 6.4.2, below.

²⁸ Thus, the hierarchical structure of the generic features (presented below) permeates both its procedural (freedom) and substantive (well-being) components.

2.8 Deriving Moral Obligations from the Generic Rights of Others

The generic rights are not rights to pursue particular purposes; they are rights to the necessary conditions for pursuing purposes in general or with general chances of success. It follows that the frustration of an agent's purpose does not necessarily violate its generic rights.

The generic rights do, however, provide a framework from which more specific rights can be derived. Such derived rights will be non-absolute for at least two reasons. First, an agent cannot have a right to put others at risk of generic harm that is hierarchically greater than that which the agent (or another agent) would suffer if prevented from acting for that particular purpose. This follows from the impermissibility of causing avoidable, hierarchically greater, generic harm to another agent, and the absence of any duty to allow another to unwittingly cause such harm.

Second, an agent does not have a right to endanger its own generic features *unless* it has freely chosen to inflict or risk such harm, and it does not thereby harm others. This is not to suggest that an agent has a duty to itself not to inflict freely chosen self-harm.

In summary, an agent cannot have a right to perform a task where the agent lacks the capacity to perform that task without endangering the generic features of itself or (morally relevant) others—*unless* either (in the case of self-harm) it has freely chosen to create such danger²⁹ or (in the case of harm to morally relevant others) such danger is necessary to protect hierarchically equal or more important generic features.

The application of the *PGC* is better explained using an example. One right derivable (with certain provisos) from the generic rights is the right not to be deceived or lied to.

Lying and other forms of deceit appear to represent a paradigmatic example of the intentional infliction of harm to another's ability to pursue their purposes with general chances of success. However, it might be objected that if the deceived person never discovers this, then no generic harm will be suffered. What generic harm, for example, is suffered by a devoted husband who never finds out that his wife is deceiving him by holding herself out as faithful when she is routinely unfaithful? What harm to his ability to act at all or with general chances of success has he suffered? More than is at first apparent! The deceiving wife can never be certain that her husband will not find out; she is risking the infliction of generic harm for her own benefit. She has no right to run this (realistic) risk, as it is not (usually)³⁰ necessary to protect hierarchically more important generic needs

²⁹ Provided the infliction of this self-harm does not impermissibly harm others.

³⁰ It is, of course, always possible to modify the example so that this deceit is in fact necessary to protect hierarchically more important generic needs. E.g., it might be

of her own. Operating on precautionary reasoning, if one's action has a number of possible outcomes, one of which involves the infliction of avoidable generic harm on an innocent person, and the action itself is not necessary to protect hierarchically more important generic needs, then one must assume that this risk will manifest itself. This is simply because not to do so puts one at risk of violating the *PGC*.

This is not to say that deceiving is always wrong. Causing generic harm where it is necessary to protect hierarchically more important generic needs of oneself or others is justified. This follows from the criterion of needfulness for action outlined earlier.³¹ With this in mind, some of the arguments presented above (2.6.2) for indirect moral status can provide further reasons why deceit infringes the *PGC*.

Invoking the earlier argument from the development of virtues, a person who deceives in circumstances where chances of discovery are small, displays a capacity for deceit that is psychologically difficult to confine. One's capacity for avoiding deceit, it appears, is proportionate to one's observance of the inclination to be truthful. In short, the ability to convince oneself that it's not really wrong has the potential to rot or undermine one's moral inclinations.

Also, invoking the proximity argument, even if the deceived person will never find out, the deceiver will usually have involved at least one other person in the deceit. In the example, the unfaithful wife's lover, or other close friend, is likely to know. This means that others will be subject to pressure to participate in deceit. Moreover, exposure to examples of deceit characteristically undermines a person's confidence in their own freedom from being deceived by those around them. This undermines one's ability to pursue one's purposes with confidence.

Other rights and obligations derivable from the generic rights will be explored in later chapters.

This book seeks to apply the moral framework developed in this chapter to the existing regulatory responses to the techniques of prenatal influence. The next chapter will, therefore, begin by outlining what these techniques are, before exploring the ethical and regulatory issues that they raise.

necessary for a woman to lie to her husband where she has been forced to marry him against her will and needs the help of her lover to escape from his control.

³¹ The example often given would be where someone lies to a Nazi, in Germany during the Second World War, about the whereabouts of a Jew to protect that Jew.

Chapter 3

Prenatal Influence of Traits: Questioning the Present, Possible, and Probable

This chapter seeks to explore the specific scientific, legal, and ethical issues raised by attempts to influence traits before birth. After exploring the concept of heredity as propounded by the current scientific orthodoxy, it examines the limitations of some scientific concepts typically used to describe the manipulability of various traits. This is followed by an exposition of the techniques capable of enabling prenatal influence, before concluding with an overview of the ethical and legal issues raised by these techniques.

3.1 Understanding Heredity

3.1.1 Genes, Chromosomes, and the Phenotype

A brief exposition of the concept of heredity is required before we can examine the amenability of traits to prenatal influence. The units of heredity—*genes*—are the most obvious place to start.

Genes are found scattered along tiny structures within the cell nucleus called *chromosomes*.¹ Our chromosomes come in pairs. One chromosome from each pair is a copy of the sperm's 23 chromosomes and the other is a copy of the oocyte's (egg's) 23 chromosomes. As a result, humans typically have 23 pairs of chromosomes (46 in total) within each cell; each cell carrying identical copies of these chromosomes. I say "typically," because occasionally there are more or fewer than this, due to abnormalities in the

¹ In humans, genes are also carried on circular strands of DNA inside sack-like bodies within cells, called mitochondria. There are a minimum of 30,000 human genes (see The Gene Sequencing Consortium 2001), yet only 37 genes are carried in the mitochondria (see Hopkins Tanne 1999, 593). Thus, for convenience, I shall ignore these mitochondrial genes unless otherwise indicated.

sperm or the oocyte.² This usually results in non-viability, but there are exceptions. One well known exception is Down's syndrome, which is caused by an extra copy of chromosome 21 or occasionally an extra copy of part of chromosome 21.³

One pair of our chromosomes, the *sex chromosomes*, determines our sex; the other 22 pairs are called the *autosomes*. Sex chromosomes come in two forms: the X- and the Y-chromosomes. The Y-chromosomes carry the genes coding for maleness, so that normal males have one X and one Y, whereas normal females have two Xs.

The genes themselves are found at distinct locations (called *loci*) along the chromosomes. At each locus there are a number of different forms that the gene can take, each called an *allele*.⁴ Since the particular order of genes on a chromosome will be the same for both of the paired chromosomes,⁵ it is possible to make associations between the genes held at particular loci and the traits an individual has.

At this point, I should mention that an individual's manifest traits or characteristics are collectively referred to as the *phenotype*. When we interact with people, we evidently do not see their genes, only the physical manifestation of their genes, and this is the result of interaction between the individual's *genome* (the complete set of alleles carried at all the individual's loci and non-coding DNA) and other factors, which will be examined in greater detail below.

3.1.2 Dominant and Recessive Alleles

Some phenotypic traits are influenced by variations at one particular locus on the paired chromosomes. However, the allele held at a particular locus on one chromosome might not be the same as the allele held at that locus on its paired chromosome. If the code of an allele is expressed irrespective of what allele is held at that locus on the paired chromosome, it is said to be

² Also, sometimes the chromosomes are not identical within all cells. This is called mosaicism.

³ So, instead of having two copies of chromosome 21, such offspring have three copies. Down's syndrome, or trisomy 21 as it is otherwise known, has an overall birth incidence of 1 in 700 live-births, and the

incidence at conception is...much greater, but more than 60% are spontaneously aborted, and at least 20% are stillborn. (Connor and Ferguson-Smith 1997, 118)

⁴ At the molecular level, with the gene being represented by a DNA sequence, an allele is the term given to any one particular sequence.

⁵ Except for the male's paired sex chromosomes, since the alleles on the X-chromosome will not be the same as those on the Y-chromosome.

dominant. If the code of an allele will not be expressed where the paired chromosome carries a different allele, it is said to be *recessive*.

Thus, where an allele lies on an autosome (a non-sex chromosome), and two copies of it are required for a particular trait to manifest, the trait is said to be *autosomal recessive*. Examples of traits associated with such alleles—autosomal recessive traits—include cystic fibrosis and sickle cell disease.⁶ Where only one copy of a particular gene is needed on either of the paired chromosomes, the trait is said to be *autosomal dominant*. Examples of autosomal dominant traits include Huntington's disease (see 3.4.1, below) and neurofibromatosis.

The sex-chromosomes are different. In males, since the Y-chromosome does not carry the same alleles as the X-chromosome, the alleles on the one X-chromosome will not be paired. Thus, all the alleles on a male's X-chromosome will usually be expressed, whether dominant or recessive, because there will be no other allele to counteract it. In females, who possess two X-chromosomes, all the alleles on the X-chromosome are paired. However, in a female's cells only one of her X-chromosomes will usually be switched on at any one time, which one will vary from cell to cell. Thus, even where a female has a copy of a dominant gene, she is not likely to express it to the same degree as a male.

Most traits, including most genetic disorders, are not associated with only one gene (monogenic); they are associated with many genes (polygenic). Often the precise mix of genetic and non-genetic factors on the phenotype is nearly impossible to determine. Separating these factors is somewhat like trying to unbake bread or slice it into its ingredients. Different or modified ingredients can affect the bread, but not always in predictable ways. As we shall see, talking about genes *for* certain phenotypic traits is somewhat like talking about ingredients for a thick crust or light texture. Nevertheless, scientists often talk of genes *for* phenotypic traits—genes for eye colour, genes for achondroplasia (dwarfism), genes for cystic fibrosis, etc. Clearly, talk of genes for particular traits is being used as shorthand for associations between genetic variation at particular loci and a particular trait. Scientists using this shorthand are usually not claiming that possession of a particular allele or group of alleles will *always* have a particular phenotypic effect.

3.1.3 Penetrance and Expressivity

Even single gene defects do not necessarily affect all those with the relevant alleles. Many alleles have different levels of *penetrance*, i.e., different

⁶ To avoid confusion I should point out that a person who is a carrier of sickle cell disease—i.e., has only one of the two alleles required to express it—is said to have the sickle cell trait.

frequencies with which the phenotype associated with a certain allele manifests itself in those with that allele.

Also, many alleles have different levels of *expressivity*, i.e., different levels of effect on the phenotype. Such differences might include variations in the timing and severity of onset. For example, Neurofibromatosis type 1 is known to have a highly variable level of expressivity so that one person with the relevant genotype can manifest a strikingly disfiguring skin condition, whereas another person with the same genotype might appear unaffected (see Connor and Ferguson-Smith 1997, 174).

A frequently cited example of another genetic defect whose level of expressivity is uncontroversially amenable to non-genetic manipulation is phenylketonuria (PKU)—an autosomal recessive disorder.⁷ Two copies of the recessive allele associated with PKU will render cells unable to produce an enzyme needed to metabolise the protein phenylalanine. Without this enzyme the normal cellular process that converts phenylalanine into another amino acid, tyrosine, does not occur. Those individuals whose cells are unable to perform this conversion process will, if reared on a normal diet, accumulate abnormally high levels of phenylalanine and correspondingly low levels of tyrosine. The resulting chemical imbalance severely disrupts cognitive development and can cause retarded growth, epilepsy, and hyperactivity. Fortunately, for those unable to convert phenylalanine to tyrosine, this chemical imbalance and its consequences, can be avoided if they are given a special diet (low in phenylalanine, high in tyrosine) from birth through to adolescence. Some care does, however, have to be taken, because this special diet will actually cause mental retardation if given to those who do not have two copies of the relevant recessive allele.

PKU is, therefore, a particularly good example of a method of influencing the characteristics of a child *after its birth*.⁸ Although this book is not concerned with postnatal manipulation of phenotypic characteristics—i.e., manipulation occurring after birth—in theory, there could be traits similar to PKU whose consequences might be treatable or preventable during gestational development.

⁷ The information on PKU is derived from Thapar *et al.* 1994, 749–751; and Kitcher 1996, especially 66. It is a condition affecting “on average 1 in 10 000 Caucasian neonates” (Thapar *et al.* 1994, 749).

Apparently, the level of penetrance of PKU is not affected by diet, because all those with the relevant alleles will manifest *some degree* of the trait even on a low phenylalanine diet. (Information provided by Darren Shickle.)

⁸ Since PKU is such a disabling condition, neonates are screened at birth (the Guthrie test) (see Connor and Ferguson-Smith 1997, 207).

3.2 Some Scientific Issues

There are numerous scientific concepts used to describe the manipulability of traits by attributing various properties to those traits. For example, traits can be described as

- (a) heritable (to a specific percentage or degree);
- (b) genetic;
- (c) inherited; and/or
- (d) biological.

Since usage of these concepts often leads to misunderstanding and overstatement, I will explore the limitations of each in turn.

3.2.1 Heritability

Heritability represents an attempt to measure the genetic influences of a trait without reference to the structure of the genotype on a molecular level. That is to say, without reference to the particular alleles inherited by those displaying the relevant trait. As a concept it has been applied to many traits, the most controversial being IQ and homosexuality (see 3.3.1 and 3.3.2, below).

On a general level, heritability estimates the proportion of phenotypic variability explained by genetic variability (as opposed to environmental variability) within a specific population (see Daniels *et al.* 1997, especially 51–54; Sarkar 1998, ch. 4). It represents the genotypic variability divided by the total variability of a trait in the population and is usually expressed as a percentage or a decimal ranging from 0 to 1. It follows that if all instances of variation (of a trait) in the population were associated with genotypic variability, then heritability would be 100% or 1. In contrast, if genetic variation were to contribute nothing to the phenotypic traits of a population (because all the population were genetically identical), the heritability of any phenotypic trait in that population would be 0% or 0.⁹ (In both cases, however, the traits of individuals in such populations would still depend on the interaction between their genes and their environment.)¹⁰

⁹ This figure would still be an estimate, because there is always a possibility of somatic mutation, rendering two monozygotic twins genetically different.

¹⁰ The literature often distinguishes broad and narrow heritability. This distinction is based on the idea that genotypic variability has two distinct components: additive and non-additive (see, e.g., Daniels *et al.* 1997, 52). Additive genetic variation describes the situation where every allele associated with a trait acts completely independently from its paired allele (i.e., there is no dominance), and from all other alleles. Non-additive genetic variation describes the situation where the alleles involved interact. Based on this distinction, narrow heritability describes additive genetic variability

Measurements of heritability are estimated using studies of twins and siblings reared in different environments. Genotypic variability is estimated without reference to the alleles held by individuals on the basis of the degree of genetic relatedness. For example, genetically identical twins will share all their genes, whereas other siblings (including non-identical twins) are likely to share only half their genes with each other. These genetic relationships are then compared to the phenotypic traits of particular populations of related individuals who are reared in different environments.

Thus, heritability is a property of a trait in a population in a given range of environments, rather than a property of a trait itself. At least three things follow from this. First, heritability is population and environment specific, in that its descriptive significance is tied to the specific population and range of environments studied. Second, heritability can reveal nothing about the genetic component of a trait on an individual level. It is all about genetic variability in relation to phenotypic variability *within a population*, and not an individual's genotype in relation to its phenotype. As emphasised above, a heritability figure of 0 or 0% would not indicate that the genotype of an individual within that population did not contribute to that individual's phenotypic traits; it would only indicate that within the population studied, genotypic differences are not of relevance to any phenotypic differences. Third, it follows that a heritability figure, by itself, is not sufficient to predict the likely impact of genetic or environmental manipulation.

Limitations are also inherent in the nature of the related and interconnected concepts, such as the concept of genetic.

3.2.2 Genetic

All non-genetic factors (whether or not they are inherited or biological) are collectively referred to as environmental. Also, viewed in terms of the impact of a specific gene or group of genes, the rest of the genome is environmental. Thus, as stated above, the phenotype is the result of interaction between the genes and environment.

over total variation (of a trait) in the population, and broad heritability describes both additive and non-additive genetic variation over total variation (of a trait) in the population. In other words, broad heritability is the measure of all genotypic influences, and narrow heritability is the measure of the influence of the alleles (at all loci) when they are presumed to be acting additively (i.e., completely independently of each other).

When defined as a sequence of DNA,¹¹ the genes themselves are not sufficient conditions for the development of any phenotypic traits. Genes can either be *expressed*—by coding for RNA and thereby directing the production of a protein (or part of a protein)—or they can regulate the expression of other genes. Genes cannot perform either function without an appropriate cellular environment, and the consequences of producing a protein will depend on the protein in question, the organism in which the protein is produced (often the part of the organism in which the protein is produced), and the organism's external environment.

An analogy might make this clearer.¹² If the phenotype is thought of as the area of a rectangle, then the genes are analogous to the width and the environment to the length of the rectangle. Just as the area of the rectangle is a product of both its width and length, the phenotype is the product of both the genes and environment. Also, just as it makes no sense to ask what percentage of the rectangle's area is attributable to the width, it is as meaningless to ask what percentage of a specific phenotypic trait is genetic or environmental. Variations in width might produce variations in the rectangle's area, but the width cannot be described as being 50% responsible for the area.

Since, however, a large proportion of any individual's genomic and cellular inheritance will be shared by all humans,¹³ the empirical evidence can suggest that specific alleles are (within this species) necessary and/or sufficient conditions for the manifestation of certain traits. If an allele appears to be a *sufficient* condition for a trait, then the empirical evidence suggests that any human with that allele will manifest (express) that trait if s/he survives until or beyond the time of onset. If an allele appears to be a *necessary* condition for the existence of a trait, then the evidence suggests that the trait cannot manifest in an individual who does not have this allele. Specific alleles can also be *contributory* conditions for the manifestation of a trait. That is to say that an allele can contribute to the manifestation of a trait without being either a necessary or sufficient condition for that trait. For example, the empirical evidence suggests that the *BRCA1* mutation increases the chances of a woman developing breast cancer but a woman without this mutation can still develop breast cancer, and possessing this

¹¹ DNA is an acronym for deoxyribonucleic acid, which forms the genetic material of most organisms, including all humans. DNA molecules consist of two sugar-phosphate backbones that wind round each other to form a double helix, from which bases jut inwards like the steps of a ladder (see Watson and Crick 1953). There are four bases, different orderings of which produce different proteins.

¹² I am grateful to Deryck Beyleveld for suggesting this analogy to me.

¹³ That is, certain genes and cellular environmental products are necessary for an entity to be, or become, *Homo sapiens*.

mutation does not automatically indicate that the woman will develop breast cancer (see 3.4.1).

3.2.3 Inherited

A trait is inherited if it is passed from one generation to its offspring. However, genes are not the only inherited factors capable of affecting the phenotypic traits of a child. There are at least two ways in which non-genetic material capable of influencing traits can be inherited. First, material is inherited along with the genes during fertilisation, as there is more to gametes (eggs and sperm) than genes.¹⁴ Second, material can pass from the mother to her offspring in the womb. PKU provides an illustrative example of the latter, as a child can have the PKU phenotype without carrying the associated gene, because the PKU phenotype can be caused by one of the mother's gene products—phenylalanine—crossing the placenta in excessive amounts.¹⁵

It follows that there is a conceptual distinction between the genetic and the inherited. For example, PKU can be inherited without being genetic (in the sense of having a causal input from the specific genes held by the affected person). Thus, it is possible to attempt prenatal influence by manipulating inherited factors other than genes.¹⁶

3.2.4 Biological

The genetic and inherited are also distinguishable from the *biological*. The biological is distinguishable from the genetic because some biological effects and events have no relation to the specific genes held by an individual (i.e., that individual's genotype).¹⁷ For example, mental retardation is a biological

¹⁴ A somewhat esoteric example is found in a particular species of snail, *Limnaea peregra* (see Freeman and Lundelius 1982, and Sarkar 1998, 178–179). This species of snail usually has a shell coiled to the right, but it can coil to the left where the snail carries two copies of a certain recessive allele *or* where the snail does not have these recessive alleles but its mother does, as her gene products, carried in the egg's cytoplasm, are sufficient to cause coiling to the left. Thus, in some snails the direction of the coiled shell is inherited, but not genetic.

¹⁵ Information provided by Darren Shickle.

¹⁶ Many social factors are arguably *postnatally* inherited, in the sense used here. E.g., in some societies or social groups, jobs can be subject to primogeniture.

¹⁷ The genotype is used to describe the specific alleles held either at a specific locus or by a specific individual. As indicated, this sentence utilises the terms in the latter sense.

event that can be caused by malnutrition irrespective of one's genotype. It also follows that not all biological events result from inherited factors.

3.3 Genetic Influence on Behaviour

A trait can be "genetic," or have a genetic component, in both a narrow and a wide sense. In the narrow sense, it is simply another way of saying that the trait is associated with a particular gene; in the broad sense, to declare that a trait is genetic is to say that it is not attributable *solely* to (often postnatal) environmental factors.

To claim that certain behavioural traits have a genetic component in the wide sense is hardly controversial, indeed it is almost tautologous.¹⁸ As we shall see, what is more controversial is whether any specific genes can be identified and the level of influence that these genetic factors have.

As I indicated above, even if the term is used in its narrow sense, referring to an association between a gene and a trait, this does not mean that it is claimed that the gene is a necessary or sufficient condition for the manifestation of that trait. Nonetheless, if an association between a gene and a particular trait is well-founded, then it will be possible to modify at least some instances of the trait by manipulating the gene or its products.

Finding associations between genes and traits is much more difficult for (what are presumed to be) multifactorial and polygenic traits, than with the single gene traits discussed above. Such traits require a much larger study sample, making it difficult to conduct statistically adequate research and even more difficult for any results to be replicated in later studies. Often it is difficult to distinguish a correlation or association from a cause. The extremes are rarely problematic—a strong association between having, say, cystic fibrosis and watching football would be unlikely to suggest that watching football causes cystic fibrosis. It becomes more problematic when a new association is found within a small sample in circumstances suggesting that it might be a causal factor—such as an association between the appearance of a particular region of the X-chromosome and male-homosexuality (see 3.3.2). As we shall see, this is a major problem faced by research into the genetics of complex behavioural traits, such as intelligence, homosexuality, and criminality. Another major problem is the lack of adequate specification of the relevant trait. IQ, sexuality, and criminality, it will be argued, are largely social constructs that do not seem to be capable of being defined in a non-arbitrary and non-contingent way.

¹⁸ See, e.g., Mann 1994. Also, "[e]vidence for genetic influence has been found for nearly all behavioral [sic.] disorders that have been investigated" (Plomin *et al.* 1994, 1733).

3.3.1 Intelligence

Perhaps the most controversial use of the concept of heritability (3.2.1) is found in Herrnstein and Murray's book *The Bell Curve*.¹⁹ In this work Herrnstein and Murray (1994, 105), argue that "IQ is substantially heritable" estimating "the genetic component of IQ" to be about 60%. They then claim that there are associations between IQ and socio-economic success,²⁰ and between low IQ and socio-economic dysfunction.²¹ In their words, "high cognitive ability [measured by IQ] is generally associated with socially desirable behaviors, low cognitive ability with socially undesirable ones" (ibid., 117). Thus, they argue socio-economic successes and failures are largely the result of genetic factors.

The Bell Curve concludes by suggesting the implementation of various socio-political policies. They argue that since IQ has a large genetic component, it is largely resistant to environmental manipulation, by, for example, educational mechanisms.²² Thus, they argue, money spent trying to remove the burdens of the cognitively disadvantaged is largely wasted. Also, most controversially of all, they claim that the cognitively disadvantaged include a large proportion of the African-American population.²³ The implications of this last claim have evoked the most vociferous criticisms.

If Herrnstein and Murray are to be believed, it would appear that IQ is amenable to prenatal influence and is a good indicator of high-level socio-economic potential. This latter point is of interest because parents are more likely to wish to ensure their children have a high IQ if attaining this is of social utility. (Parents might also value a high IQ in itself or because it is likely to ensure other valued goals, such as membership of MENSA.)

¹⁹ *The Bell Curve* has been heavily criticised (see, e.g., Kincheloe *et al.* 1996, Devlin *et al.* 1997, and Fraser 1995).

²⁰ Measured by, e.g., the attainment of places at elite educational institutions (in Chapter 1 of *The Bell Curve*), and high income occupations (in Chapter 2).

²¹ Measured by, e.g., low academic attainment (Chapter 6), high divorce and "out-of-wedlock births" (Chapter 8), and increased likelihood of criminality (Chapter 11).

²² See Chapters 17–20. Earlier, in Chapter 13, they state,

Changing cognitive ability through environmental interventions has proved to be extraordinarily difficult. At best, the examples of special programs that have permanently raised cognitive ability are rare. (Herrnstein and Murray 1994, 314)

²³ E.g.,

In discussing IQ tests, for example, the black mean is commonly given as 85, the white mean as 100, and the standard deviation as 15 A total of 156 studies are represented . . . [in their statistical graph], and the mean B/W [black/white] difference is 1.08 standard deviations, or about 16 IQ points. (Herrnstein and Murray 1994, 276)

However, if the concept of heredity is defined as above (3.2.1), then it follows that Herrnstein and Murray cannot rely upon it to ground many of their claims. This follows from the limitations of the concept drawn out in 3.2.1.

First, the descriptive significance of heritability is tied to the specific environment and population studied; therefore, it is not meaningful to extrapolate in the way that Herrnstein and Murray wish to. Even within these limits they estimated heritability of IQ at only 60% (which appears to be a vast overestimate: see Devlin *et al.* 1997), which means that, *within the populations studied*, variation in IQ is *at least* 40% attributable to *environmental variation*. Since their research used siblings (especially twins) who were either brought up by their genetic parents or separated from their genetic parents after birth (and sometimes a long time after birth), this must be postnatal environment. Thus, Herrnstein and Murray's figures are far from conclusive.

Second, heritability can reveal nothing about the genetic component of a trait on an individual level, so Herrnstein and Murray's conclusions for individuals are not supported. A heritability figure by itself is not enough to empower those who wish to ensure their child is born with a high IQ. The genes (or environmental factors) responsible for variation of that trait (in individuals) need to be identified and, at present, no such genetic component has been identified.²⁴

Third, heritability does not predict the likely impact of genetic and environmental manipulation, and so Herrnstein and Murray cannot use the concept to ground the idea that certain social policies are a waste of time. Indeed, their claim that state-initiated attempts to aid the cognitively less able have failed (see Herrnstein and Murray 1994, chs. 17–20), might just as well be an indication that such attempts failed to go far enough, rather than (as the authors imply) indicating that IQ lacks environmental manipulability.

Another major problem is the characterisation of the trait supposedly being investigated in such studies. Herrnstein and Murray believe that IQ tests measure intelligence or, using their preferred phrase, cognitive ability, as described by Spearman's (1904; 1927) general factor, *g* (see Herrnstein and Murray 1994, ch. 1). This has been questioned, not least because it reduces intelligence to a unidimensional concept and appears to be biased towards white Western cultural skills (see, e.g., H. Gardner 1995; Carroll 1996; Hunt 1997).

Herrnstein and Murray's main argument for the adequacy of IQ tests begs the question. They argue that "if the tests had been fatally flawed or merely uninformative, they would have vanished" (Herrnstein and Murray

²⁴ Certain features that are indirectly relevant to IQ (such as memory) have, however, been associated with certain alleles.

1994, 6). This longevity argument has no more force when applied to IQ tests than it has when applied to other once accepted beliefs, such as flat Earthism.

IQ tests are, indeed, severely flawed as a measure of intelligence. IQ scores describe performance at a particular set of tasks that have been designed to measure a particular set of skills. Thus, IQ is defined relative to these tests and the set of skills that they are designed to measure. It follows that IQ does not describe a physical or behavioural trait that can meaningfully be the result of gene-environment interaction. It is nothing more than a social construct. And it makes no sense to investigate the causal input of one's genes to the possession of skills defined according to contingent social values.

3.3.2 Homosexuality

Same-sex sexual preference—a homosexual phenotype—appears to have a significant (postnatal) environmental component, perhaps affected by variables such as history, culture, personal experience, and personal choice. Male homosexual behaviour certainly appears to have been more prevalent in those cultures that were very tolerant towards it, notably the Assyrian and Græco-Roman (see Baron 1993). Nonetheless, a number of scientists have attempted to identify biological, inherited, and/or genetic components associated with homosexuality.

I will first review the major studies on the assumption that homosexuality (or, indeed, any form of sexuality) can be non-arbitrarily defined. I will then question this assumption and deny that sexuality is capable of being non-arbitrarily defined and scientifically controlled for.

Simon LeVay (1991) claims to have found that a specific region of the hypothalamus was smaller in homosexual men, than in heterosexual men, but slightly larger than in heterosexual women. As LeVay concedes, 26 of the 41 subjects died of AIDS, including all 19 of the homosexual men in the study,²⁵ which might itself be a cause of these differences. However, LeVay argues that the size difference was apparent even when comparing the homosexual and heterosexual male AIDS victims, AIDS did not affect the other parts of the brain that were studied, and there was no association between the size of this region of the brain and the length of survival from the time of diagnosis (see LeVay 1991, 1036).

Nevertheless, LeVay's findings have yet to be replicated (see Byrne 1994, 29; Mann 1994). Also, *since finding a correlation or association is not*

²⁵ There were 19 homosexual men, including 1 bisexual man, all of whom died of AIDS. Also, 6 of the 16 heterosexual men, and 1 of the 6 presumed heterosexual women, died of AIDS (see LeVay 1991, 1035).

the same thing as finding a causal component, it is possible that homosexuality itself causes the shrinkage of the hypothalamus, rather than the converse.

In another study, Hamer *et al.* 1993a claim to have identified a particular region of the X-chromosome—region 28 of the long or “q” arm—that is associated with some forms of male homosexuality. More specifically, Hamer *et al.* showed that this marker on the X-chromosome was shared by 22 of 40 pairs of homosexual brothers. Again, this result has not been replicated (see LeVay and Hamer 1994, 25; Mann 1994; D'Alessio 1996, 33).²⁶ One problem seems to be getting an adequate sample group.

In yet another study, Bailey and Pichard 1991 measured concordance rates—the percentage of those who share a particular trait²⁷—for relatives of male homosexuals. They found concordance rates of 52% for identical (monozygotic) twins, 22% for non-identical (dizygotic) twins, 11% for adopted brothers, and 9.2% for the non-twin biological. All of the siblings in the study were reared together, which means that they shared a great deal of their (postnatal) environment. Since genetically identical twins share all their genes and other biological siblings share only half their genes, the difference between the concordance rates of identical and non-identical twins might be thought to support the view that there is a genetic contribution to homosexuality. However, the finding that the non-twin biological brothers were far less prone to homosexuality than non-identical twins, suggests that homosexuality is largely environmental, as they share the same proportion of genes.²⁸ Also, the result for adopted brothers is inconclusive. Indeed, since one would expect a genetic contribution to homosexuality to result in concordance that is proportional to the percentage of shared genes, all the results of this study are inconclusive. As King and McDonald put it

the discordance for sexual orientation is striking and confirms that genetic factors are [an] insufficient explanation of the development of sexual orientation. (1992, 409)

A very similar line of research has been performed measuring concordance rates for relatives of female homosexuals (see Bailey *et al.* 1993). They found concordance rates of 48% for identical twins, 16% for non-identical twins, 6% for adopted sisters, and 14% for non-twin biological sisters. This

²⁶ Hamer *et al.* 1993a has also been criticised by Fausto-Sterling and Balaba 1993, to which they have responded in Hamer *et al.* 1993b. For further criticisms, see Baron 1993, and Byrne 1994, 31.

²⁷ Thus, if all individuals in a study share a trait, the concordance rate is said to be 100%.

²⁸ The fact that twins are more likely to have similar life experiences than non-twins might be the explanation for this statistical difference.

might be interpreted as indicating that there is a genetic component to female homosexuality. However, the sample was very small, totalling 153 siblings.

Even on the assumption that the trait under study is adequately defined, all of these studies raise more questions than they answer. Once the assumption itself is questioned, the foundations of this research rot away. The problem is constructing a non-arbitrary definition of a homosexual phenotype so that persons can be non-arbitrarily classified according to their sexuality.

Is one's sexuality to be defined according to the gender of those whom one has had sex with or according to the full range of one's sexual desires or fantasies? Can we determine sexuality according to self-proclaimed behaviour or desires, even though people are known to lie to others *and to themselves*? Is it possible to control for persons whose only preference is to rebel against the societal norm? Is sexuality any different from other preferences, such as preferences for or against peanut butter or horror movies?

The studies reviewed fail to address these issues. In LeVay's study, for example, those who died of AIDS having participated in sex practices with members of their own sex were assumed to be homosexual, and the sexual orientation of those who had died of non-AIDS causes was *presumed* by reference to an estimated population incidence of homosexuality (see LeVay 1991, 1035; LeVay and Hamer 1994, 21). Bailey and Pichard rely on an estimated 2% population incidence of homosexuality. How is it possible to estimate a population incidence of homosexuality as opposed to estimating the number of people in a particular familial, social, historical, and cultural setting who actually have sexual relations with persons of the same sex as themselves?

3.3.3 Criminality

Criminal behaviour *per se* cannot be described as a genetic trait, because criminality is defined relative to institutionally posited rules, rather than a set of behavioural traits. That is to say, criminality does not describe a set of behavioural characteristics; it describes the social characterisation of certain conduct. For example, whether one infringes the laws relating to sexual conduct might depend on factors such as the relevant age of consent and the legality of certain sexual acts, which vary from country to country. Thus, talk of "criminality genes" can only be meaningful, if used as shorthand for genes associated with identifiable traits, rather than biologically unrelated groups of traits.

It might be thought that the term can legitimately describe genes associated with violent behaviour. Various studies claim to identify genes creating a predisposition for violent behaviour. One study has shown a

deficiency of a gene product, monoamine oxidase A (MAOA), to be associated with aggressive behaviour in the men of a Dutch family. This led a team of researchers to create a line of transgenic mice in which the gene encoding MAOA was modified to provide a model of MAOA deficiency (see Cases *et al.* 1995). This study found that the mice, when adult, manifested "a distinct behavioral syndrome, including enhanced aggression in males" (*ibid.*, 1763). Thus, talk of violence genes—genes associated with a predisposition for aggressive behaviour—has a degree of plausibility; although more studies would be needed to establish this. The empirical evidence would be likely to suggest such a gene as a contributory condition, rather than a necessary or sufficient condition (see 3.2.2). However, any discovered predisposition for aggressive behaviour will manifest itself differently in different environments. In some environments it might contribute towards violent behaviour, but in others it might contribute towards sporting prowess or entrepreneurial success.

Talk of "crime genes" must also take account of the fact that crime itself can only be measured indirectly, through its detection. Thus, any associations attributable to crime, are actually associations with detected or self-attributed crime, and there may be factors relevant to detected and self-attributed crime that are not relevant to crime *per se*. For example, it is possible that those with lower intelligence are more likely to be caught when committing criminal acts. This is one way of explaining Herrnstein and Murray's claim, if it is in fact true, that "criminal offenders have average IQs of about 92, eight points below the mean" (1994, 235). One reservation I have with Herrnstein and Murray's claim is that it is plausible that cognitive ability could affect the *type of crime* committed, so that while those committing the more primitive crimes—e.g., violent crimes such as rape and assault—might, on average, have low cognitive abilities, and those committing the more complex crimes—such as some forms of fraud—might, on average, have high cognitive abilities. Thus, *even if* Herrnstein and Murray have correctly identified associations, these must be restricted to the specific crimes that they have studied. Indeed, it is possible that genes associated with one specific type of crime could also be associated with more socially desirable traits.

Although it might be possible to manipulate the likelihood that a future child might be detected engaging in *some* criminalised conduct indirectly—by manipulating genetic factors that, in some environments, predispose towards pursuing, or being detected pursuing, *certain purposes*—it is misleading to talk of "crime genes." Also, we must be careful to avoid confusing correlations/associations with causal factors. For example, it is known that males commit the vast majority of crime,²⁹ but this does not

²⁹ E.g., there are currently 61,740 male compared to 3,349 female prisoners (see Ford 2000).

imply that criminality is the result of a Y- or X-linked gene or an autosomal gene expressed only in males. It is more likely that the social upbringing of males increases the likelihood of such conduct. Having said that, certain male hormones are widely known to increase aggressive behaviour, so there might be a genetic predisposition for some aggressive behaviour, which in some contexts might contribute towards violent behaviour.

3.4 Techniques of Prenatal Influence: Practice and Possibilities

A number of things can be done to influence the traits of offspring before their birth. Any technique enabling discovery of existing traits or the prediction of future traits, if applied before birth, could reduce the chances of having a child with undesired traits. Often this will involve having a different child to the one that would have been born with the undesired trait.

The techniques enabling prenatal influence range from those that are relatively *direct*—such as aborting a fetus before its birth on the basis of ultrasound pictures revealing the presence of an undesired physical trait—to those that are relatively *indirect*—such as trying to modify a gene that increases the likelihood that an undesired trait will manifest. Not all possibilities are currently feasible.

For expository purposes, these techniques will be grouped into three categories. The first category comprises those techniques capable of leading to the destruction or non-implantation of subjects with undesired traits or genes—the techniques of prenatal screening and testing (3.4.1). The second category comprises the most controversial means of influencing traits—the techniques of prenatal gene therapy and cloning (3.4.2). The final category is a miscellaneous group of other present and potential ways of influencing traits (3.4.3), comprising mainly non-genetic techniques, i.e., those not involving direct analysis or manipulation of genes.

This chapter will conclude with a general overview of the legal and ethical issues raised by these techniques (3.5).

3.4.1 Prenatal Screening and Diagnosis

It is possible to ensure that only those gametes, embryos, or fetuses possessing desired³⁰ genes or traits are allowed to gestate. This can be done following some form of prenatal testing or screening. Before exploring the relevant techniques, we need to distinguish diagnosis/testing from screening.

³⁰ Note the distinction between “desired” and “desirable.” I do not wish to suggest that the traits that parents happen to desire in their offspring are, in any objective sense, necessarily valuable.

Prenatal testing and diagnosis involves the testing (particularly genetic testing) of individuals thought to be at an increased risk of a particular genetic or congenital disorder. In contrast, prenatal screening involves the application of risk assessment procedures to populations of pregnant women for a condition where there is no family history or other evidence of its presence (see EGE 1996, para. 1.2; BMA 1998, 34–35). The difference is the target population. Both can reveal diagnostic information, i.e., information capable of being used to influence traits before birth. However, since screening is not intended to provide a definitive diagnosis, a more specific diagnostic technique is likely to be used before the prenatal entity is destroyed or discarded.

Some techniques can be used for prenatal screening or as a means of prenatal diagnosis, whereas others might be used purely for screening or purely for diagnosis. As we shall see, many diagnostic techniques carry risks for the subject. Since prenatal screening is generally non-invasive, cheaper, and less complicated, it tends to be routinely available in most Western countries. In contrast, diagnostic tests are less freely available, but tend to provide more accurate information.

Prenatal ultrasound can be used for prenatal screening or prenatal diagnosis. This technique enables visualisation of the fetus during its development and carries no proven hazard for either the mother or the fetus.³¹ At present over 280 congenital malformations can be detected by ultrasound, generally at 18–20 weeks gestation (see Connor and Ferguson-Smith 1997, 202; ACGT 2000, 12). Thus, prenatal ultrasound provides a means of discovering whether a child has, or is likely to have, certain congenital traits or conditions. This raises the possibility of abortion to avoid the birth of a child with undesired traits,³² raising many ethical and regulatory issues. Aside from the degree of protection granted to the fetus, there is an issue of whether all detectable congenital differences have the same moral significance. For example, is aborting a fetus with anencephaly (no brain) in any way comparable to aborting a fetus with Down's syndrome? There are also issues relating to the amount of counselling and information that should be given to the parents, and the extent to which more specific diagnostic techniques should be offered.

Genetic diagnosis is currently possible during pregnancy and before implantation.

³¹ Researchers are, however, still exploring the possibility that ultrasounds carries risks to the fetus. A recent study by Kieler and colleagues (2001) provisionally concludes that men who were exposed to ultrasound *in utero* have a higher probability of becoming left-handed. Other studies are needed to establish whether this is more than a statistical oddity, as it suggests that ultrasound exposure is capable of damaging the brain of a gestating child.

³² Ultrascans could also be followed by prenatal treatment of the developing child.

Genetic diagnosis of the human oocyte (egg) or preimplantation embryo—preimplantation genetic diagnosis (PGD)—has been performed since 1989.³³ PGD is in fact a collection of techniques ranging from polar body biopsy on the first polar body (diagnosis of a sister cell of the unfertilised oocyte) to blastocyst/trophoblast biopsy (diagnosis of part of the embryo at the blastocyst stage). The most popular method—blastomere biopsy—involves the diagnosis of 1–2 cells removed from the preimplantation embryo during cleavage (cell division) (see Handyside 1998; Harper *et al.* 1998).

The embryo can also be genetically diagnosed during its gestational development, using prenatal diagnosis (PND). PND also refers to a collection of techniques (not all of which are forms of genetic diagnosis). One technique, chorionic villus sampling (CVS), involves the removal of a sample of the placenta from the womb by either a catheter (a thin tube) or a needle, usually between 8–12 weeks gestation. Another, amniocentesis, involves removing a sample of amniotic fluid by inserting a thin needle through the abdomen into the womb. This is usually performed at or later than 15 weeks gestation, but there is a form of early amniocentesis that is increasingly being used between 12 and 15 weeks (see Connor and Ferguson-Smith 1997, 197).

There are also a number of emerging forms of minimal or non-invasive PND techniques, such as diagnosis of fetal cells removed from the maternal circulation and diagnosis of transcervical cells (see Bianchi 1998; Findlay 1998 *et al.*, 1413; ACGT 2000, 12). These tend to be utilised for purely diagnostic purposes.

Since an undesired result in PND is usually followed by termination, for some ethical positions it is significant that CVS can be performed at an earlier gestational stage than amniocentesis. However, amniocentesis remains the most popular procedure (see WHO and PAHO 1999, 97). In fact it accounts for 90% of prenatal diagnostic tests performed in the UK (see ACGT 2000, 11).

Since both CVS and amniocentesis are invasive procedures, they carry a small additional risk of spontaneous miscarriage. For amniocentesis this additional risk is 0.5–1% and for CVS and fetal blood sampling it is 1–3% (see ACGT 2000, 11). The importance of this depends on the degree of moral protection granted to the embryo or fetus at this stage of development; the greater the protection granted the more problematic running such a risk will be.

A number of technical limitations beset the performance of genetic diagnosis; problems that increase when the number of cells in the sample

³³ It was first reported as successful in Handyside *et al.* 1989. In the future PGD might also be feasible on the sperm.

decrease. PGD³⁴ is more prone to diagnostic failure and inaccuracy than PND, simply because PND tends to involve relatively large samples, providing high numbers of cells for analysis.³⁵

Also, genetic diagnosis—whether done before implantation or during gestational development in the womb—has the potential to reveal information about relatives. Huntington's disease is a good example. This disorder usually manifests between the ages of 40 and 50, causing progressive neurodegeneration leading to involuntary movements, loss of motor control, and dementia, with death occurring 10 to 20 years later (see, e.g., Sermon *et al.* 1998). It has no cure, the only treatment being symptom relief and support (see Braude *et al.* 1998, 1422). Since this is an autosomal dominant disorder, the discovery that a child has the Huntington's gene will indicate that (at least) one of its parents (and, at least one, of its grandparents, etc.) also has the gene.³⁶ So, genetic diagnosis of the prenatal child has the potential to reveal information not only about the person tested but also about relatives. These relatives will know that they are at risk because of their family history but might not want to know their own status. This is important, because the ethical weight attached to the right not to know might render the use of some techniques of prenatal influence unethical.

It has, for example, been suggested that those at risk from Huntington's who do not wish to be tested themselves

could be offered the option of having IVF³⁷ with preimplantation biopsy and testing of their embryos for Huntington disease without ever being informed of the specific test results. (Sermon *et al.* 1998, 1434)

³⁴ For analysis of current methods of PGD see Wells and Sherlock 1998.

³⁵ Diagnosis from a single cell by amplifying the DNA has been problematic because of the problems of allele dropout—failure to detect one of the two alleles present (see Findlay *et al.* 1998; Wells and Sherlock 1998, especially 1392)—and contamination of the sample with DNA from other sources (see Harper *et al.* 1998, 1343). Moreover, the method used to detect chromosomal abnormalities, fluorescence *in situ* hybridisation (FISH)—which involves the staining of chromosomes with a fluorescent marker so that they can be easily examined under a microscope—can lead to misdiagnosis where the cell diagnosed does not carry the same chromosomes as the rest of the embryo, i.e., mosaicism (see *ibid.*, 1343). Diagnostic inaccuracy (i.e., false positives and false negatives) can be increased by human error.

³⁶ Since Huntington's appears to have total penetrance, possessing the defective allele means that it will kill you, unless something else kills you first.

³⁷ IVF (*in vitro* fertilisation) involves the fertilisation of an egg outside of the body. This acronym can also be used to describe the whole process from fertilisation to implantation.

It is also suggested that such couples could also use PND (see *ibid.*). In practice, a number of practical problems are likely to arise: couples are likely to infer carrier status from unsuccessful implantations and confidentiality is harder to maintain with the necessary multiple medical participants (see *ibid.*; Braude *et al.* 1998, 1425).

One obvious ethical question is whether it is acceptable to seek to know the genotype of one's offspring with the intention of denying the same information about oneself to the future child (were it to be allowed to develop). Many argue that such a practice is unacceptable. For example, the ethical guidelines of the International Huntington Association and the World Federation of Neurology Research Group on Huntington's disease (1994), recommend that prenatal testing that could reveal information about relatives should only be performed if the parent's status is known.

Testing for late onset disorders raises additional issues. Any child born with such a disorder might have many years of disease-free life. Huntington's disease is a good example of such a disorder. Another example is the *BRCA1* mutation, which is thought to code for one of many forms of hereditary breast cancer commonly affecting carriers of the mutation between the age of 30 and 50 (see Wagner and Ahner 1998). This later mutation is associated with the following effects:

For women	80% lifetime risk of breast cancer and 40% of ovarian cancer.
For men	3 times more likely to develop prostate cancer.
For both men and women	4 times more likely to develop colon cancer. ³⁸

Although prenatal testing has not yet been used to detect the *BRCA1* mutation, it is now possible, and so, it is likely to be a matter of time before it is performed (see Wagner and Ahner 1998, 1125). However,

Particularly when breast cancer is diagnosed in its initial stage the chances of survival are excellent at >70%. Breast cancer caused by a *BRCA1* mutation is currently considered to have the same chances of recovery as sporadic breast cancer. (Wagner and Ahner 1998, 1125)

Thus, the carrier of the *BRCA1* mutation—unlike a carrier of the Huntington gene—might not manifest its associated traits and, if the mutation carrier does, it might not be fatal. Does this render testing for the mutation immoral?

³⁸ Information derived from Wagner and Ahner 1998, 1125.

Also, PGD requires the use of medically assisted reproduction (IVF or ICSI). For the one in ten heterosexual couples who are clinically infertile³⁹ this might be no greater burden than they would otherwise have to endure, but for those who are able to reproduce unaided, assisted reproduction involves many otherwise unnecessary risks and burdens. For example, the live birth rate for IVF/ICSI, where the gametes are fertilised outside the body, is under 20% per treatment cycle.⁴⁰ (However, the success rates will be considerably higher where the couples are fertile and are willing to undertake a number of treatment cycles.) Moreover, where PGD is used for a dominant disorder such as Huntington's disease, the potential number of embryos available for transfer to the womb will be reduced by about 50%. In addition, the production of sufficient oocytes for removal involves hormonal stimulation that has many attendant risks for the woman. The ethical significance of these issues depends on the ethical theory invoked. For example, the significance of the attendant risks for the woman, where the woman is competent and has been informed of them, will be trivial for some autonomy-based theories and very important for more paternal theories.

3.4.2 Prenatal Gene Therapy and Cloning

Of the techniques of prenatal influence, cloning and prenatal gene therapy evoke the greatest number of science-fictional images and claim the loudest condemnatory cries. Yet, neither has been successfully applied to human beings.

Prenatal gene therapy involves the direct manipulation of the genetic component of the phenotype. There are two forms: germ-line and somatic gene therapy. Germ-line gene therapy involves the deliberate genetic modification of germ cells (sperm or oocytes), their precursors, or the cells of early embryos where the germ-line has yet to be segregated. Whereas somatic (or somatic cell) gene therapy involves the modification of somatic (body) cells, which cannot ordinarily be passed on to future generations.

Although new genes were successfully introduced into the germ-line of animals over a decade ago, human gene therapy has so far been restricted to somatic therapy and this has been relatively unsuccessful.⁴¹ Nonetheless, prenatal gene therapy might be the only way to prevent some genetic disorders—particularly those causing irreversible damage to the fetus before

³⁹ This is the standard estimate (see, e.g., Warnock 1985, para. 2.1, 8).

⁴⁰ The live birth rate of IVF treatments in the UK between April 1998 and March 1999, excluding frozen embryo replacements, was 19.6% (see HFEA 2000, 14, Table 4.4) If frozen embryo replacements are taken into account, it was only 18% (see *ibid.*, 11).

⁴¹ For good overviews of the current limitations and uncertainties of prenatal gene therapy see Senut and Gage 1999; Staff 2001; and Zanjani and Anderson 1999.

birth. However, at present the dominant view—which I will question in Chapter Five—is that prenatal gene therapy (especially germ-line gene therapy) is immoral and should be prohibited.

Human cloning presents another possible method of influencing the genetic features of a child before it is born. Cloning is more than a method of manipulation; it is a method of creating a human embryo. For our purposes, cloning can be defined as the deliberate creation of a human being that is genetically identical to another human being or has the same nuclear gene set as another human being. In theory, this could be done by either splitting an early embryo (which occurs naturally in the creation of identical twins) or by transferring the nucleus of an egg, embryonic cell, or somatic (body) cell into a denucleated egg or embryonic cell.

The creation of Dolly the sheep was a massive step towards the realisation of human clones. As is now common knowledge, Dolly was created by the transfer of the nucleus of a somatic cell (taken from an adult sheep's mammary gland) into an egg that had had its nucleus removed (see Wilmut *et al.* 1997). Over the last few years the "Dolly technique" has been developed and applied to mice, cows, goats, and pigs.

Recently, the technique was applied to human cells (see Cibelli *et al.* 2001).⁴² Advanced Cell Technology (ACT), a US biotechnology company, reprogramming eggs by somatic nuclear transplant so that they entered the pronuclear state (which is usually only found in fertilised eggs) and, in some of these, the nuclei proceeded to divide into six cells (*ibid.*, especially 29). The published paper emphasises that the aim was purely to derive stem cells from these reconstituted embryos and not to create a human child. They state that,

In order to prevent any possibility of reproductive cloning, the EAB [i.e., the independent Ethics Advisory Board used by ACT] requires careful accounting of all eggs and embryos used in the research. (Cibelli *et al.* 2001, 27)

At first sight, this research appears to bring the creation of a cloned human child one step closer. However, according to one of the pioneers of the Dolly technique,

Even if you took the nucleus out of an unfertilised egg it would still develop to the six-cell stage under the right conditions without necessarily adding the nucleus of an adult cell. The fact that it did not develop beyond six cells

⁴² In 1999 a team of Korean scientists claimed to have inserted the nucleus of an adult cumulus cell—the type of cell that surrounds the ovary—before chemically activating the manipulated egg (see Baker 1999). They claimed that the conceptus was allowed to divide twice before it was killed, but this research was never published and met with a "global chorus of scepticism" (*ibid.*, 16).

suggests it is fairly lightweight research. (Ian Wilmut, quoted in Connor 2001).⁴³

Even after the successes with animals there are a number of uncertainties surrounding the use of the Dolly technique. For example, it is unclear whether the cloned being will have the tissue age of the egg or the somatic cell donor. Moreover, it is not entirely clear whether the technique carries increased risks of future complications, such as cancer. The consequences of cloning are already known to vary from species to species.

At present, the dominant view is firmly against the creation of a cloned child. The ethical arguments against cloning—which will be evaluated in Chapters Five and Six—include claims that cloning involves unacceptable risks, undermines genetic identity, instrumentalises or objectifies human beings, and opens the door to eugenics (see, e.g., UNESCO 1998; HGAC and HFEA 1998b; NBAC 1997).

It should, however, be kept in mind that creating a clone of an individual will never replicate that individual. For example, creating a human child using the Dolly technique would not produce an exact copy of the nuclear donor, because it would have different mitochondrial genes,⁴⁴ cytoplasmic products, womb environment, and a very different postnatal environment, including different individual choices and different personal relationships with others. Thus, a human clone would be far less like the person from whom its nuclear DNA was derived, than two identical twins are like each other. In short, producing a child that is genetically identical to another will not produce an exact replica of the cloned individual. Genotype is not phenotype.

3.4.3 Other Techniques of Prenatal Influence

So far I have concentrated on the best known techniques of prenatal influence. There are a number of other possibilities, many of which do not directly involve the identification, manipulation, or modification of genes.

Attempts to influence traits by environmental manipulation become commonplace after birth. Most parents strive to ensure that their child's intellectual potential is maximised through education, that their health is ensured by adequate nutrition and medication, and so forth. Before birth the

⁴³ It has, e.g., been reported that a senior scientist on the editorial board of *e-biomed* has resigned claiming that he didn't think that ACT "have come anywhere near the mark of what it would take to prove" their claims (quoted in Arthur 2001, 10).

However, ACT claim that other related research successes will be published in *Science* (see Gottlieb and McKie 2001, 7).

⁴⁴ Unless it shared the same maternal line with the nuclear donor.

phenotype is to some extent manipulable through environmental factors, such as the nutrition and drugs received by the mother before and during pregnancy. The effect of prenatal non-genetic factors is starkly illustrated by the thalidomide incident during the 1960's. Thalidomide, which was given to pregnant women to prevent morning sickness, caused severe congenital malformations. Alcohol is also known to have deleterious effects on the perinatal child (see Bagheri *et al.* 1998; Connor and Ferguson-Smith 1997, 194–195), as is smoking (see, e.g., Zenzen 2000). There are in fact many environmental factors, collectively called terogens, capable of causing congenital malformations (see Connor and Ferguson-Smith 1997, 194–195).

In some cases the introduction of certain drugs, proteins, or vitamins during pregnancy could ensure or prevent the manifestation of certain traits. For example, the evidence suggests that taking folic acid before conception reduces the chances of the resulting infant having neural tube defect, such as spina bifida and anencephaly (see Anonymous 1991; *Lancet* 1991; Wald 1994).

Since the Y-chromosome (which is necessary for a child to be male) can only be carried by the sperm, it might be possible to select the sex of one's future child by manipulating its conception or pre-conception. For example, some scientists believe that it is possible to influence the sex of one's offspring by sperm selection,⁴⁵ or (although this is unlikely) by ensuring that the man has a certain diet before conception takes place.

In practice, non-genetic forms of prenatal influence are often perceived as being less ethically problematic than genetic forms. It needs to be asked whether it should matter what type of technique is invoked for the purposes of prenatal influence.

3.5 Legal and Ethical Issues Raised by the Techniques of Prenatal Influence

Having explored the possibilities for prenatal influence it is now possible to expand upon the legal and ethical issues highlighted so far.

The most obvious ethical (and regulatory) issue centres on the status of the subject of prenatal influence: the gamete, preimplantation embryo, embryo, and the fetus. The question is whether any of these entities are owed moral protection and, if so, what weight this moral protection has in comparison to the moral protection granted to others, such as the potential parents. This issue was addressed in the last chapter.

⁴⁵ E.g., a US clinic in Fairfax, Virginia claims to have sex selected nearly 200 babies with the help of sperm sorting machine (see *Irish Times* 2001). See also Mayor 2001.

The moral interests of potential parents also raise questions such as whether there is a moral right to reproduce, and if so, what the strength of this right is and whether it includes a right of access to medically assisted reproduction. These include the issue of whether any such right is purely negative (i.e., imposing duties of non-interference only) or also positive (i.e. imposing duties of assistance). Moreover, if there is a right to reproduce, it needs to be asked whether this right encompasses a right to reproduce in a specific way or with specific consequences. Does it, for example, include a right to clone?

Another issue requiring consideration rests on the claim that PGD is superior to PND because it avoids abortion of a fetus. The validity of such a claim will depend on, *inter alia*, the legitimacy of abortion (generally and for trait selection), whether failure to implant is distinguishable from post-implantation abortion, the moral status of the oocyte and unimplanted embryo, and the weight given to the fact that PGD makes it easier to influence the characteristics of one's offspring and more difficult to prevent parents acting for certain motives.

Techniques that have yet to be successfully performed on humans, such as cloning by nuclear substitution and germ-line gene therapy, raise other issues. For example, is it morally permissible to attempt to clone a human using the Dolly technique given that it will probably have a low success rate?⁴⁶ Is it morally permissible to attempt germ-line gene therapy on humans given the difficulties highlighted by the "Beltseville pig" incident, where the genetic switch that was supposed to trigger the production of growth hormone was permanently switched on, resulting in an overly obese pig with many subsequent complications? Also, how effective and risk-free does a diagnostic technique have to be before it can be legitimately applied to a potential child?

One question that keeps arising—the central question of this book—is whether it is morally legitimate to deliberately manipulate the characteristics of one's child before its birth. One appealing suggestion is that the legitimacy of prenatal influence depends on the characteristic or trait in question. This raises a number of questions. First, does it matter whether the trait is relevant to the possession of intrinsic moral status? Second, does it matter that some traits that are irrelevant to the possession of moral status—such as Down's syndrome and Huntington's disease where moral status is granted to those who are human, sentient, or agents—will hinder the future offspring's range of future purposes? Third, does it matter whether the trait can be treated, or influenced by other

⁴⁶ Although the technique has moved on since the creation of Dolly, her creation involved 277 attempts to transfer the nucleus to the egg, and only one out of the 29 embryos implanted was born alive (see Wilmut *et al.* 1997). For a good summary of the present situation see Rideout *et al.* 2001.

means, such as education or drug treatment, after birth? Fourth, are the needs and requirements of one's society relevant considerations?

This book will address many of these questions by applying the framework developed in Chapter Two. There are, however, a few general comments to be made here.

One suspects that if it were possible to choose the characteristics of one's offspring, the vast majority of Western first born children would be thin, white, heterosexual males without any propensity for any purpose-restricting genetic condition. There would inevitably be exceptions. For example, it is known that some couples with congenital deafness or achondroplasia (dwarfism), would choose to have children with these traits. Moreover, it is conceivable (though I suggest unlikely) that—if it could meaningfully have a manipulable genetic component—some homosexuals would prefer to have homosexual offspring (see Davis 1997a).

Many parental preferences are specific to contingent tastes and cultural values. Some parents might value offspring with increased musical, sporting, or intellectual ability; others might prefer children with religious, mathematical, or artistic predilections. Many might want their child to have the greatest all-round genetic potential possible.

The burden of parental expectations leaps to the forefront of our concerns, but there is also a danger of the opposite, that where a child lacks the genetic component associated with a trait it will be assumed to lack the ability to display that trait.⁴⁷ For example, if it became the norm to enhance innate potential for musical ability, parents of children who have not been "enhanced" *might* assume that their child lacked such potential. If this is a serious risk, the question is how much ethical weight should be attached to it.

So far, I have concentrated on the potential harm to the parents and the future child. Indeed, later chapters will explore these issues further—particularly, the claim that parents have a right, legitimate interest, or even an obligation, to influence the characteristics of their children, and the issue of whether the birth of an "impaired" child can be said to harm that child. However, there are at least three other persons, or categories of persons, who might be harmed—if the conception of harm is sufficiently wide—by prenatal attempts to influence the traits of offspring. First, prenatal choice could harm existing children. For example, parental

⁴⁷ E.g., the film *Gattaca* presented a rather negative image of people burdened with unrealistic expectations of high-attainment or, conversely, false images of future failure based on their genotype. One character, played by Jude Law, was so haunted by his failure to live up to specially selected genotype that he attempts to take his own life twice; becoming paralysed on the first attempt and succeeding on the second attempt. Although this film is purely fictional, these images are not beyond the realm of the possible.

selection of characteristics lacked by their existing children could cause psychological harm (feelings of rejection/inadequacy) to their existing children. The opposite might occur, i.e. not manipulating the characteristics of a child before it is born might actually harm existing children. For example, if a child is born with an avoidable genetic defect this will drain family resources that could have been utilised for the benefit of existing children. Second, prenatal choice could harm other potential parents, by increasing societal pressure on them. For example, attempts to avoid the manifestation of certain genetic traits might cause those carrying the relevant genetic mutation to be subject to illegitimate pressure to use PGD and PND to avoid their having children with those traits. Third, prenatal choice might harm those existing persons who possess the trait that parents wish to avoid in their own children. For example, attempts to ensure a heterosexual phenotype could cause psychological harm to existing non-heterosexuals. In other words, unfettered parental choice could have the effect of legitimising social prejudices. Fourth, some forms of prenatal choice might—as I suggested earlier—reveal information about relatives who wish to remain ignorant.

I have kept this overview relatively general because what is in issue to one moral theory or perspective is not necessarily so to another. However, since this book is concerned with the application of a specific criterion of moral permissibility, the following chapters will be less general.

Chapter 4

Regulation of Genetic and Reproductive Techniques I: Prenatal Genetic Testing and Embryo-Fetal Research¹

The legal and ethical issues raised in the last chapter present a number of regulatory possibilities. Regulatory overview could be triggered by specific techniques, by attempts to achieve certain purposes (irrespective of the method or technique used), or by the performance of specified activities, such as the use of specific expertise, facilities, or funds. The regulatory response could take a number of forms: it could (depending on the legal system) involve mechanisms such as constitutional provision, primary or secondary legislation, non-legislative codes of practice, or professional self-regulation. The response could be supported by powers of enforcement or sanction ranging from criminal or private law powers/sanctions to social pressure. Moreover, the stringency of the regulatory response could range from prohibitive to permissive. In short, regulatory potential is extremely diverse—there can be variation of the regulatory trigger, form of regulation, form of regulatory enforcement or sanction, and/or regulatory stringency.

This chapter and the next will explore some of the issues raised by specific techniques of prenatal influence and their use as triggers for regulatory oversight. In the process I will analyse the regulatory mechanisms that have been adopted, or are likely to be adopted, in EU countries, Canada, and the US, with particular emphasis on the UK. Detailed summaries of these laws are to be found in the Appendices.

Since, left unconfined, this area is potentially too broad for overview here, I will concentrate on the regulation of abortion and prenatal diagnosis (PND), preimplantation genetic diagnosis (PGD), embryo research, cloning, and prenatal gene therapy. These are not the only methods of prenatal influence (see Chapter Two), but regulatory responses do seem to centre on these techniques. Other methods of prenatal influence—such as

¹ An earlier version of the information on the regulation of prenatal genetic testing and embryo research in the EU countries—in sections 4.3.2, 4.4.1, and 4.5.2—was presented in Beylvelde and Pattinson 2000b.

manipulation of the gestational environment—tend to attract different regulatory responses and appear to be universally ignored by legislatures. Moreover, the techniques explored here tend to attract more concern, primarily because they exhibit greater potential for prenatal manipulation.

As its title indicates, this chapter will focus on the issues raised by the regulation of prenatal genetic testing—encompassing both PGD and PND—and embryo-fetal research. Since these techniques raise issues that are far too complex for definitive assessment, my conclusions will be highly qualified. Thus, I will tend towards the defence of *prima facie* presumptions rather than conclusive answers. I will, however, indicate some of the main complexities and rule out those positions that clearly violate the requirements of the PGC.

As before, I use the term “embryo” to include what is sometimes referred to as the pre-embryo or zygote, and the phrase “embryo-fetus” to encompass all stages of development from fertilisation to birth.

4.1 Reiteration and Additional Remarks on the Application of the PGC

This chapter will build on ideas defended in earlier chapters, especially Chapter Two on moral status. Thus, to reiterate, my contention is that moral status is proportional to the degree of agency-related behaviour and characteristics displayed. It might seem strange to take characteristics and behaviour that are manifestly below what we would expect of an agent as evidence of agency. Strange or not, we are morally obliged to treat even the most implausible hypothesis of agency seriously. When faced with a direct conflict between such hypotheses, the least plausible has less force. Less force is not, however, no force. The consequence is a gradualist view of the status of the embryo-fetus, so that its moral status gradually increases during its gestational development (cf. Warren 1973, 49, Tooley 1972; Sumner 1981).

At the end of Chapter Two I hinted that there is no simple formula for working out the precise requirements of the PGC in many multi-variable conflicts. I did, however, argue for criteria to resolve single variable and simple multi-variable conflicts. Faced with a conflict between claims of beings displaying different degrees of agency-related behaviour and characteristics, the *criterion of avoidance of more probable harm* provides a hierarchical structure for determining priority. Faced with a conflict between different levels of harm or need, the *criterion of degrees of needfulness for action* provides a hierarchical structure. Faced with a conflict between different degrees of probability with regard to the occurrence of harm, a reformulated *criterion of avoidance of more probable harm* provides a structure for priority. It is, however, much more complex

when the situation involves conflicts between more than one of these variables (i.e., moral status; level of harm/need; probability of harm occurring) simultaneously.

Where someone is at fault for the creation of the dilemma, criteria can be offered to evade the difficulties of weighing what appear to be incommensurable variables. Gewirth himself suggests that some dilemmas involving multi-causal factors can be solved by the *principle of intervening action*, which states that

when there is a causal connection between some person A's performing some action (or inaction) X and some other person C's incurring a certain harm Z, A's moral responsibility for Z is removed if, between X and Z, there intervenes some other action Y of some person B who knows the relevant circumstances of his action and who intends to produce Z or who produces Z through recklessness. The reason for this removal is that B's intervening action Y is the more direct or proximate cause of Z and, unlike A's action (or inaction), Y is the sufficient condition of Z as it actually occurs. (Gewirth 1981, 12)

Thus, he argues, if I am faced with the need to torture my mother on television as the only way of appeasing a terrorist's threat to kill thousands of innocent persons in a distant city with a nuclear bomb, I am justified in refusing to injure my mother because the terrorist's act is a sufficient intervening condition for the occurrence of the immoral act.² In response to a counter-example by Levinson (1982), Gewirth adds the *principle of prior wrong action* to his armoury (see Gewirth 1982). This principle holds that agents who are responsible for the creation of a dilemma can be estopped from claiming priority in the resolution of this dilemma.

While a lot can be said for principles like the principle of intervening action and the principle of prior wrong action, they are of no help in the resolution of many multi-variable conflicts. Theoretically, there are at least three ways of resolving more complex conflicts:

- (a) introducing criteria for resolving conflicts between the above criteria;
- (b) using a random method of choosing between the horns of a dilemma (e.g., tossing a coin); or
- (c) relying on procedural, rather than substantive, criteria for resolution of such dilemmas.

² This example is unfortunate as by placing the subject's mother on the side of the dilemma that he favours, Gewirth adds intuitive baggage to his side of the scales. If Gewirth's argument for this principle is sound, then it applies irrespective whether the subject's mother is the one who must be tortured, or one of the thousand people threatened by the bomb. Although the side that the subject's mother is on might bring other considerations into play.

If (a) is possible then this is what we ought to aim to do. In the absence of such an approach (or, I shall argue, even in the presence of principles or criteria of dilemma resolution) the third option, (c), is a practical necessity, which might sometimes result in a solution being derived by random choice (b).

The argument for (c) develops out of a more general objection, from which this specific problem arises. According to this objection, since we have no omniscient, infallible Platonic philosopher king to work out the precise requirements of the *PGC* for us, a completely moral order is practically unobtainable. On a purely theoretical level, this objection has some force. However, the *PGC* can, without violating its precepts, take into account the practical realities of the human condition.

In practice, some decisions can legitimately be left to the discretion of individuals and other, more problematic decisions, must be delegated to appropriate decision-making bodies or persons. Without procedural measures for dealing with dilemma resolution difficulties, the force of the uncontroversial implications of the *PGC* could be undermined. It goes without saying that any such procedural mechanisms must be constrained by the *PGC*, as the *PGC* must not knowingly or avoidably be violated. Thus, practical legitimacy must be given to the decisions of those, appointed in accordance with *PGC*-derived procedures,³ who seek to make a "good faith" attempt to apply the *PGC* with a certain degree of competence (see Beyleveld and Brownsword 1994, especially 183–4). Where a "good faith" attempt is one that is sincere and committed, expending effort that is commensurate with the importance of getting it right.

Following Beyleveld and Brownsword, I am arguing that faced with controversy over differing (but reasonable) interpretations of the *PGC*'s application, or of the empirical evidence, we must, for practical purposes, have a legitimate system of dispute prevention and resolution. I can see no way of avoiding this conclusion. If we do not presume the legitimacy of rules or decisions made by those legitimately appointed, competently making a "good faith" attempt to apply valid moral principles, attempted social regulation will be immoral at the level of attempt as well as achievement.

What about everyday decisions on relatively simple matters? In practice, since people just do not have the time or competence to consider the morally relevant implications of all their possible acts or omissions, individuals must be inculcated with those beliefs and intuitions conducive to automatic and unthinking compliance with the *PGC*. Expanding on one of the arguments presented in Chapter Two (2.6.2) for the conferment of indirect moral status

³ I do not concentrate on what procedures can legitimately be used to appoint decision-makers here, however, Gewirth argues for the "method of consent" (see Gewirth 1978, 319–322). See also Beyleveld and Brownsword 1994, Chapters 7–9.

(i.e., the argument for development of virtues), I am suggesting, on epistemic grounds, a place for *PGC*-derived intuitions and dispositions.

This might strike the reader as akin to Hare's two levels of moral thinking: the intuitive and critical level (see Hare 1981, 39–53). Hare's intuitive level comprises "relatively simple, *prima facie*, intuitive principles or dispositions," justified at what he calls "the critical level" (see Hare 1981, 40). Hare argues that the critical level is necessary because the intuitive principles

are not self-justifying; we can always ask whether the upbringing was the best we could have, or whether the past decisions were the right ones, or, even if so, whether the principles then formed should be applied to a new situation, or, if they cannot all be applied, *which* should be applied. To use intuition itself to answer such questions is a viciously circular procedure; if the dispositions formed by our upbringing are called into question, we cannot appeal to them to settle the question. (Ibid., original emphasis)

Thus, Hare's critical level does not permit appeals to intuition; instead all answers are to be worked out by application of the supreme principle of morality (which for Hare, as a preference utilitarian, is the Principle of Utility).

There are similarities between the approach that I am advocating for the application of the *PGC*, and Hare's distinction between intuitive and critical moral thinking. What I am suggesting is that the choice of principles to inculcate individuals with (for use on the intuitive level) must be justified at a critical level defined by the *PGC*. This critical level must be understood as having both a substantive and procedural component, where the procedural component is that argued for by Beyleveld and Brownsword, i.e., legitimately appointed persons conducting a "good faith" attempt to apply the *PGC*.

Therefore, procedurally, the *PGC* not only authorises but actually requires individuals to apply the *PGC* by the intuitive internalisation of its norms *and* constrained decision-making mechanisms. For present purposes, this means that when evaluating regulatory attempts, it needs to be asked whether the result is a clear application or violation of the *PGC*, or could reasonably be the result of a competent decision-making body applying the *PGC*.

4.2 Comments on the Indirect Application of the *PGC*

Are those legitimately appointed to make decisions constrained by the requirements of competence and good faith without guidance in multi-variable conflicts? So far, all I have done is highlight the relevant variables:

when comparing any action or inaction to its alternatives, an agent must take account of the probability that any potentially affected being is an agent, the level of *PGC*-relevant need and harm potentially brought about by that action, and the probability of the action bringing about this harm or need-fulfilment.

One problem is that these variables seem to be measured in terms of incommensurable probabilities. The degree of moral status is measured in terms of probability of agency, giving us only a relative ordering; it does not precisely quantify *how much* moral status a being has. The criterion of degrees of needfulness for action (applied to determine *PGC*-relevant harm and need) also provides only a relative ordering; it does not measure *how much* a generic feature is needed for action. We are faced with probabilities rather than commensurable units.

Nonetheless, all *intra-variable* conflicts are to be resolved by versions of the *criterion of avoidance of more probable harm*. Even the criterion of degrees of needfulness for action is a version of this criterion, as it gives greater weight to those generic features whose hindrance or removal will more probably interfere (or tend to interfere) with an agent's ability to achieve its purposes. Thus, if possible, it is the criterion of avoidance of more probable harm that must be used for *inter-variable* conflicts, as a necessary means of avoiding or limiting violations of the *PGC*. Clearly, no one category of variable—moral status; degree of harm/need; probability of harm/need manifesting—can take overall priority in a multi-variable conflict. However, these categories don't share exactly the same degree of intimacy to the probability of harm occurring. For a being to be capable of suffering *PGC*-relevant harm at all, of any degree of severity or risk of occurrence, it must be an agent.

Three other points should be borne in mind. First, for a being to be treated as a duty-bearer in any meaningful sense it must be an ostensible agent. Second, the precautionary thesis is subject to the proviso that all things must be equal, which will not be the case where the burdens placed on ostensible agents are very onerous causing basic generic harm by severely restricting their purpose-fulfilment. Third, workable regulatory policy requires practical solutions and assumptions, even where the relevant variables appear to be incommensurable or uncertain. Regulatory policy must be constrained by, but is not identical to, abstract moral theory.

These four factors, I will suggest, require the degree of moral status possessed to be given *marginally* more weight than the other variables. The degree of moral status of all potentially affected beings must be the first (and in some extreme cases the only) variable considered as a means of achieving the best balance of moral variables. It must be given marginal presumptive supremacy. After tentatively evaluating certain hypothetical multi-variable disputes, my reasoning will be made more explicit.

Where the probability of agency is entirely metaphysical, lacking *any* supportive empirical evidence (as is the case of just about all non-living objects,⁴ such as tables), *any* straight conflict between its possession of possible generic rights and those of a being displaying evidence of agency, must be determined in favour of the latter. A number of considerations underpin this hypothesis. First, there is no supportive evidence of a table's agency, while (through the interpretative gauze of precautionary reasoning) there is some supportive evidence in the case of a living being, and so the risk of inflicting generic harm is far greater in the latter case. Second, the burden of preventing possible harm imposed on ostensible agents would be too great if inanimate, non-interacting objects were to be granted protection (see the next paragraph). Third, a table cannot meaningfully be granted duties of protection because (if it were an agent) it is equally likely to suffer generic harm by the alternative of any (in)action. For example, burning a table is just as likely to cause it generic harm as not burning it—on this point there is no relevant evidence favouring any metaphysical story over any other. Thus, for all practical purposes, the possible agency of such objects can be ignored.

Where there is empirical evidence capable of supporting the hypothesis of agency that is (at most) marginal—as in the case of very simple organisms displaying only patterned life-sustaining behaviour—the probability of agency is so low that it can never coherently be given priority in the case of conflict with an *ostensible agent*. Even though precautionary reasoning will not allow a possible agent to be treated as a non-agent, in these circumstances the likelihood of agency is weighted firmly in the favour of the ostensible agent and granting more than extremely marginal duties of protection to such possible agents would require prohibitive, purpose-undermining caution. After all the precautionary argument is subject to the proviso that all things must be equal, and level of caution that would be required to protect bacteria, body cells, and other creatures displaying only minimal evidence of agency renders all things far from equal. Living cells are killed when we scratch, bacteria are killed when we wash, insects are killed by our vehicles, etc. Thus, I suggest that any *generic need* of an ostensible agent should be able to override even the most basic harm (i.e., death) to such an entity. Nonetheless, non-generic concerns—mere whims not connected with the maintenance or advancement of an ostensible agent's generic features—will not be sufficient to override even this extremely low

⁴ I say "just about all" because it is possible to envisage a non-living robot displaying some (or even, possibly, sufficient) evidence of ostensible agency. Fiction offers many hypothetical examples, such as the films *Blade Runner*, *Bicentennial Man*, and *A.I.*

Note that outside clear cases there is some difficulty defining "life" or a "living being" (see, e.g., Silver 1998, Chapter 1).

degree of moral status. In practice, this is unlikely to prevent the exercise of any of an ostensible agent's presumed generic rights.

It gets more difficult (and more controversial) where the degree of empirical evidence is low but above marginal. Where, for example, we have a human gamete displaying marginal behavioural evidence of agency but also displaying a small degree of evidence of potential future ostensible agency, or an early embryo displaying slightly more evidence of agency. Neither example presents either significant or sufficient agency-related evidence. In fact, a laboratory rat displays *considerably* greater relevant characteristics and behaviour. Nonetheless, even when faced with a conflict with an ostensible agent, precautionary reasoning does not allow us to entirely ignore the evidence suggesting that such entities might possibly be locked-in agents. Thus, its possible intrinsic worth must be given a degree of protection. As the embryo develops the degree of protection required will incrementally increase, until it reaches a stage where only a realistic risk of basic generic harm to an ostensible agent will be sufficient to justify its destruction.

Within these constraints, it should be clear that the indirect application of the *PGC* cannot support treating the embryo-fetus as if it had full, or even nearly full, moral status, nor can it support treating the embryo-fetus at all stages of development as a valueless thing.

The four factors stated above suggest something more than this. The conclusion they suggest is this: when faced with a conflict between an ostensible agent and a being displaying far less agency-related evidence, all the ostensible agent's basic generic features are to be presumptively treated as at least as valuable as the other's most basic generic feature (i.e., its life). In other words, where the difference between the levels of moral status of two beings in conflict is large (as in the case of a normal adult human and a very early embryo), and the difference between the levels of harm is not (i.e., where both potential harms will be basic, etc.), the balance of variables *prima facie* favours the being with greater moral status. Thus, all things being equal, death to an early embryo runs less risk of violating the *PGC* than a less basic harm (such as the loss of an arm) to a normal adult human being.

Four factors outlined above—the varying level of evidence supporting the hypothesis of locked-in agency, the reality that only ostensible agents can be practical duty-bearers, the moral and practical need to avoid unduly onerous burdens, and the practical constraints of workable regulatory policy—do not produce precise, mathematical guidance for resolving complex multi-variable conflicts. They do, however, point in certain directions. In some conflicts, as in the one above, the *prima facie* balance favours one party over the other. These factors give marginally more weight to any difference in the level of moral status compared to differences in the degree of potential harm/need-fulfilment or risk of its occurrence. If this

reasoning is sound it does not solve all our problems, but it does illustrate the type of reasoning required by competent attempts to apply the *PGC*.

The next section will morally evaluate abortion and prenatal diagnosis (PND), before exploring the regulatory position in the member states of the EU, Canada, and the US. The full details of these laws are tabulated in Appendix 1.

4.3 Abortion and Prenatal Diagnosis (PND)

The legitimacy of prenatal diagnosis followed by selective abortion requires analysis of abortion. A pregnant woman might seek abortion on a number of potential grounds. Some are more controversial than others. Abortion to save the life of the pregnant woman is the least controversial. Indeed, since this is a relatively simple conflict where the same level of prospective harm will be suffered by either the pregnant woman or the gestational embryo-fetus, the pregnant woman's greater moral status is conclusive.⁵ Abortion is justified in such circumstances.⁶

Abortion is, however, far more controversial where the variables are not quite as clear-cut. The considerations discussed above need to be kept in mind. These point to a number of factors. For a start, where there is a conflict between the protection of the pregnant woman's generic features and the protection of the generic features of the embryo or fetus, the pregnant woman will just about always have far greater moral status. The embryo-fetus' moral status will, however, increase during its gestational development. Thus, early abortion will generally be easier to justify than late abortion.

Another important factor is that pregnancy (and indeed abortion) carries risks to the life and (mental and physical) health of the pregnant woman.⁷ This risk is affected by the gestational development of the embryo or fetus. During the early stages, aborting a developing child holds far fewer risks to

⁵ The pregnant woman will just about always have greater moral status. There are, of course, exceptions. E.g., where the empirical evidence indicates that the pregnant woman is brainstem dead, requiring a life support machine for her essential functions.

⁶ Assuming the probability of the harm occurring is relevantly similar or irrelevant.

⁷ The damage to the woman's mental health can be particularly severe where she does not want to carry or give birth to the child. The risk of psychological harm to the woman will be proportional to her desire to avoid pregnancy. The general strength of this desire is suggested by the common argument that any attempt to prohibit abortion will merely drive it underground. E.g., where abortion is prohibited women tend to use unofficial means or travel to other countries; e.g., more than 6,000 Irish women travel to Britain for abortions every year (see Payne 1999).

the life and health of the pregnant woman than bringing it to term.⁸ This situation might, however, be reversed just before birth, as then abortion might hold greater risk of mortality than carrying to term. The psychological consequences of the pregnancy can, however, also affect the pregnant woman's short- or long-term health or survival.

Also, as stated earlier, all positive rights to assistance are limited by the comparable cost proviso, which states that no agent has a positive right to assistance unless it can be provided at less than comparable cost to the provider. Thus, insofar as abortion raises issues relating to positive rights (of the pregnant woman or the embryo-fetus), these rights will be limited by this proviso.

Before going any further, it is useful to explore Judith Jarvis Thomson's famous article, where she argues that even if a fetus has moral status equal to a normal adult human, abortion would still be permissible in many circumstances (see Thomson 1971). Thomson draws an analogy between being pregnant and being involuntarily attached to a world-famous violinist who must remain attached for nine months if he is to survive. She argues that a woman has no duty to carry a fetus if she has no duty to allow the violinist to remain connected to her. There appear to be only three lines of response: one can accept that there is a duty in both cases (i.e., it is impermissible to disconnect the violinist or abort the fetus); accept that there is no duty in either case; or identify a morally relevant disanalogy between the two cases.⁹

The third option has attracted the most support. Some commentators wish to rely on a notion of fault, pointing out that, except in the case of rape, a pregnant woman has voluntarily run the risk of pregnancy by having sexual intercourse (see, e.g., Warren 1973, 49). However, it needs to be asked whether the woman's carelessness (e.g., failure to use contraception), or mere unluckiness (e.g., contraceptive failure), constitute prior wrongs that are sufficient to estop her from pleading the costs of pregnancy.¹⁰ The idea

⁸ This is a frequently cited fact, see, e.g., Mason and McCall Smith 1999, 116; Petersen 1996, 92. It is conceivable that where unsafe abortion practices are used, the risks to the pregnant woman could be greater for abortion than from carrying to term. However, unsafe abortion practice seems to occur in those places where mortality during pregnancy and childbirth is high. About 585,000 women die each year as a result of complications arising during pregnancy and childbirth, the vast majority in the developing world (see <http://www.who.int/rht/msm/index.html>), and about 78,000 deaths occur as a result of the 20 million unsafe abortions undertaken around the world each year (see WHO 1998, 8).

⁹ Boonin-Vain 1997, suggests a fourth—rejecting the authority of such arguments from analogy. However, insofar as arguments from analogy are merely substitutive instances of the principle of universalisability, this is not a rationally acceptable option.

¹⁰ Sufficient, that is, to invoke Gewirth's principle of prior wrongdoing.

seems to be that the woman usually has a degree of control over the occurrence of the pregnancy in the first place. Before holding the woman responsible for the pregnancy, and thus the occurrence of the dilemma, we need to explore the costs of pregnancy avoidance. The (PGC-measured) costs of the alternatives—using contraception, permanently removing one's reproductive capacity, or abstaining from sex—need to be taken into account. It is plausible to argue, on empirical grounds, that the most effective ways of avoiding pregnancy are likely to inflict basic generic harm. This is clearly the case with surgical means of removing fertility and arguably the case with abstaining from sex (at least in situations where the abstainer's only reason for abstaining is unwillingness to be involved in the reproductive enterprise).¹¹ Slightly less dramatic means of contraception are readily available in the developed world. Most of these carry far less risk of inflicting basic generic on the user.¹² These are not, however, totally effective. If, despite the user's precautions, they fail, the user can hardly be held to be morally at fault for the pregnancy. In such circumstances, I suggest that abortion can provide the most appropriate method of limiting harm to women who do not want to carry a child.

To take stock of the factors I have emphasised so far: (a) the pregnant woman will (just about always) have greater moral status; (b) the early embryo has a very low moral status; (c) pregnancy is a greater threat to the woman's life than abortion (at least in early gestational development); (d) pregnancy can threaten the mental and physical health of the woman; (e) the costs of avoiding getting pregnant can be very damaging to the basic generic features of adult humans (who are usually ostensible agents); and (f) any duties to aid the embryo or fetus will be limited by the comparable cost proviso. Together, these factors support at least a presumption in favour of early abortion where the pregnant woman does not at that time want to carry and give birth to any child, and attempted to avoid getting pregnant.

I offer a presumption, rather than a definitive assertion, because of factors pointing in favour of the embryo-fetus: (a) abortion will result in the death of a possible agent; (b) the woman will usually have *some* control over the occurrence of the pregnancy in the first place, and (c) abortion can cause psychological harm to those who feel strongly for the unborn child. Moreover, if it were possible to remove the developing embryo-fetus from

¹¹ My claim is that repression of sexual desire—which for fertile heterosexual couples is the only sure way of avoiding pregnancy—is likely to cause severe psychological harm or increase pressures favouring PGC-violating behaviour. It is also likely to damage the ability to form and maintain relationships between heterosexual couples, which will have concomitant adverse consequences for individuals and society.

¹² Some contraceptive methods do carry risks. E.g., the contraceptive pill is known to carry increased risks to the life and health of the woman. These increased risks are, however, less than those associated with pregnancy.

the pregnant woman's womb without killing it,¹³ then removal, rather than abortion is preferable, at least where adequate support mechanisms are available for the pregnant woman (including supportive social attitudes), and the embryo-fetus is capable of developing into a child. Also, since the embryo-fetus does have moral status, the method of abortion should, all things being equal, tend towards the one least likely to cause pain to it.¹⁴

4.3.1 Abortion to Avoid Undesired Traits

So far I have avoided many of the issues raised by the use of abortion as a means of avoiding undesired traits. Most of my comments have been restricted to situations where the pregnant woman simply does not want to carry *any child* at that time. What about situations where the woman objects to carrying a child with certain traits?

Many issues will have to be left until Chapter Six, as they go beyond this specific question. Some points, however, need to be raised here. Some traits are directly associated with the degree of agency-related evidence displayed and are, therefore, relevant to the possession of moral status. For example, an anencephalic child (i.e., one born without all or most of the brain) will manifest very little evidence of agency. It cannot display any significant stimulus response or any cognitive potential and, even with artificial aid, it is unlikely to survive after birth. Its limited moral status will thereby greatly increase the strength of any claim in favour of its abortion.

Other traits do not affect the degree of agency-related evidence. For example, since a child with Down's syndrome will usually develop into an ostensible agent,¹⁵ an embryo-fetus with an extra copy of chromosome 21

¹³ In the case of early abortion, for this condition to be satisfied it must be possible for the embryo to be gestated elsewhere, in either another's womb or an artificial womb. Where the fetus is capable of being delivered alive, all things being equal, this is what we should seek to do. In practice, some late term abortions result in the birth of a live fetus that is sometimes left to die, apparently without legal sanction in the UK (see Mason and McCall Smith 1999, 132–133).

¹⁴ All things might not be equal, where the methods have different degrees of risk for the pregnant woman.

¹⁵ Albeit a societally incompetent ostensible agent, see Beyleveld and Pattinson 1998 for a discussion of specific task and societal incompetence. In simple terms, a "socially incompetent ostensible agent" is an ostensible agent that is not able to function in the society it lives in without unintentionally harming itself or others, though its abilities are such that it would be able to function competently (i.e., without an unduly increased risk of inadvertent harm) in a less complex society. "Specific task incompetence" refers to an inability to perform the relevant task without unintentionally harming itself or others.

will usually have the same moral status as one with two normal copies at the same degree of gestational development.

The greater degree of moral status possessed by the embryo-fetus, the harder it is to justify abortion. Thus, the defensibility of abortion can depend on the trait in question.

In the last chapter, we saw that some forms of PND can cause spontaneous abortion (see 3.4.1). If abortion following PND is legitimate, those techniques presenting risk to the embryo-fetus create a dilemma. If the intention is not to abort after an undesired PND result, then to use PND techniques such as CVS is to put the embryo-fetus at unnecessary risk, but to require the pregnant woman to consent to abortion if the result of the diagnosis is unfavourable is to put coercive pressure on the woman to kill a possible agent. The practical significance of this is shown by a survey of obstetricians conducted in 1993, which found that one third required an undertaking to terminate an affected pregnancy before proceeding with PND (see Green 1995).¹⁶ This dilemma, insofar as it is a dilemma, can be evaded by merely explaining to the woman, the futility of diagnosis where she has no intention of acting on it. To force the pregnant woman to consent to abortion before using PND is, however, *prima facie* illegitimate, because she might want to use the information for other purposes. For example, the pregnant woman might want to find out whether her child will have a congenital abnormality before it is born so she can prepare herself for its birth.

Fortunately, this possible dilemma often does not arise. Previous studies of termination decisions after prenatal diagnosis show that for a diagnosis of trisomy 13, 18, or 21, Tay-Sachs, anencephaly, spina bifida, or thalassaemia, between 73 and 100% choose termination (see Wertz and Fletcher 1993, 555).

Where, however, PND (or any diagnostic or screening technique) is used to test for late onset disorders that have no treatment or cure, the dilemma is far greater. Should the embryo-fetus not then be terminated it will develop into a child with knowledge that could cause it serious harm. Huntington's Disease, for example, is a late onset disorder—usually manifesting between the ages of 40 and 50—with 100% penetrance and invariably severe expressivity,¹⁷ causing progressive neurodegeneration leading to dementia, and death 10–20 years later. It has no cure, the only treatment being symptom relief and support. Thus, should a parent choose to test for the mutation associated with Huntington's Disease and not terminate (or fail to implant) the embryo-fetus, the future child will have destructive knowledge

¹⁶ Interestingly, "[t]he BMA considered this approach to be unacceptable" (BMA 1998, 52).

¹⁷ See Chapter Three for explanation of these terms (3.1.1) and discussion of Huntington's disease (3.3.2).

about its own future that it might not want to have. In fact, only 10 to 15% of at risk adults choose to be tested (see Report of a Working Party of the Clinical Genetics Society 1994, 791). If the test is positive, the evidence suggests that those with the mutation are likely to suffer severe psychological harm. In fact, one study concluded that deaths due to suicide among persons with Huntington's are almost four times greater than the corresponding proportion for the US Caucasian population (see Farrer 1986).

If the test is negative, the evidence suggests that such individuals whose family members manifest or are at risk of manifesting the disorder, are likely to suffer from "survivor guilt," similar to that suffered by wartime soldiers who live when their friends are killed (see Wexler 1985, 297–298; Andrews 1991, 38). Thus, even if it were otherwise permissible to test for such late onset disorders, the possibility that the parents will choose to continue the pregnancy cannot be ignored. Since such knowledge is likely to cause generic harm to the future child, and once the child's Huntington's-status is known it will be very difficult to keep it from the child without violating the PGC,¹⁸ the presumption must be against permitting PND (or any prenatal diagnostic or screening technique) for incurable late onset disorders such as Huntington's.¹⁹

This presumption seeks to protect the moral interests of the tested subject. These moral interests include those that it has when tested (embryos are possible agents) and those that it has as an ostensible agent in the future (the act of testing an embryo for an adult onset condition implies that the embryo is expected to become an adult in the future, so conduct towards it must be assessed with reference to the rights that it will have in the future).

Since this is an autosomal dominant disorder, the discovery that a child has the Huntington's mutation will indicate that one of its parents also has the relevant mutation and will develop Huntington's disease. There are, however, mechanisms for revealing whether the fetus is at a high risk of inheriting the mutation without revealing whether the relevant parent has the mutation.²⁰ Where the parents themselves do not wish to know of their own

status vis-à-vis Huntington's, the presumption against testing the embryo-fetus is even stronger. All things being equal, parents cannot be permitted to gain the benefit of knowledge about their future child when they do not want their child to have such knowledge about themselves. A child is a potential future carer of its enfeebled parents and, therefore, will have at least as much interest in discovering whether either of its parents have Huntington's as the parents have in discovering whether it has Huntington's. For the parents to deliberately place themselves in a more favourable position than they intend to allow their future child to be in, where both have equal claim to be in such a position of knowledge, is to violate the future child's rights (see Beylvelde, Quarrell, and Toddington 1998, 147–155).

Even if attempts to influence traits before birth are generally legitimate, it does not follow that PND is legitimate, at least where other less problematic techniques could have been used. Thus, the legitimacy of PND will always depend on the context of its use, including the available alternatives.

A context where PND might be easier to justify is where it is used as a means of identifying conditions so that they can be treated prenatally, rather than as a means of determining whether to abort the developing embryo-fetus. Where the condition to be identified by PND is potentially life-threatening for either the embryo-fetus or the pregnant woman, the use of the technique is (all things being equal) non-problematic. Where, however, PND is used to identify whether prenatal manipulation to influence the traits of the developing embryo-fetus is viable, its permissibility will, once again, depend on the trait in question.

Leaving the main issue—whether it is legitimate to attempt to influence traits before birth—until Chapter Six, the next section will explore the regulatory positions in the 17 countries studied.

4.3.2 Regulation of Abortion and PND

Abortion is the most comprehensively regulated area falling within the terms of this book. Of the 17 countries studied, 14 have specific legislation and the legality of abortion in the remaining three is affected by constitutional provision or equivalent. The legal situation is not, however, straightforward in all of these countries. In Canada, for example, over a decade ago the Supreme Court struck down the abortion provisions of the Federal Criminal Code as incompatible with a provision of the Canadian Charter of Rights and Freedoms,²¹ thereby leaving the country with little by way of federal

¹⁸ E.g., the parents might be tempted to lie to the child, say, in response to questions provoked by the fact that family members will have the condition.

¹⁹ Obviously, if a suitable cure for Huntington's disease develops the presumption will be rebutted.

²⁰ E.g., although a mutation test on the fetus will also reveal whether one of the parents has the relevant mutation, an exclusion test will not. The exclusion test is a "linkage" test that targets genetic markers close to the site of the mutation and seeks to identify (from blood samples taken from the relevant grandparent, parent, and the placenta) whether the fetus has inherited part of the relevant chromosome (chromosome 4). If the fetus has not inherited this marker from the affected side of the family, then it has not inherited Huntington's. Whereas, if it has inherited this chromosome, then its risk of having the condition, where one of its grandparents is known to have the condition,

increases from 35% to 50% (see Beylvelde, Quarrell, and Toddington 1998, 136–137).

²¹ *R v Morgentaler* [1988] 1 SCR 30.

regulation. The US Supreme Court has been even more interventionist and has re-assessed the jurisdictional competence of individual states on numerous occasions during the last 30 years.

Detailed tabulated information on the laws of the EU countries, Canada, and the US can be found in Appendix 1, alongside full citation of the relevant legislation and legislative provisions.

General Provisions on Abortion

The vast majority of countries under study have decriminalised abortion up to a specific period of gestation, where certain conditions are satisfied. The most permissive is the legislation of the UK (excluding Northern Ireland)²² and the Netherlands, which *in practice* allow abortion on demand up to 24 weeks gestation. In Austria, Belgium, Denmark, Germany, Greece, Luxembourg, and Portugal, abortion is generally restricted to gestational development of less than 12 weeks. Abortion is generally permitted up to 18 weeks in Sweden, up to 16 weeks in Finland, and 12 weeks and six days in Italy. Until recently abortion was primarily restricted to the first 10 weeks in France, but reports suggest that this has recently been extended to 12 weeks (see Appendix 1).

In Britain, the majority of abortions are performed under s. 1(1)(a) of the Abortion Act 1967 (as amended).²³ This provision permits abortion up to 24 weeks only if performed by a registered medical practitioner, and two registered medical practitioners have formed the opinion that the continuation of the pregnancy will involve risk, greater than if the pregnancy were terminated, of injury to the physical or mental health of the woman or her family. This will just about always be the case during the earlier stages of pregnancy.²⁴ Thus, in practice, this provision appears to support abortion on demand in the UK up to 24 weeks gestation.

²² In Northern Ireland it is illegal to carry out abortion other than to save the life of the mother or to prevent serious damage to her physical or mental health. This is because abortion is still governed by the old British legislation as limited by the defence of necessity, as specified in *R v Bourne* [1939] 1 KB 687. This old British legislation is the Offences Against The Person Act 1861, and the Infant Life (Preservation) Act 1929 as applied by the Criminal Justice (Northern Ireland) Act 1945.

²³ In 1996, 97% of abortions in England and Wales were performed under this provision (see Mason and McCall Smith 1999, 116–118).

²⁴ According to Mason and McCall Smith,

It is arguable that the risks of an abortion to the health of the woman are always less than those of full-term pregnancy—particularly if the termination is carried out in the first trimester. Equally, it is obvious that the mental health of a woman who is carrying an unwanted pregnancy must suffer more damage if she is forced to carry her fetus than it would be [sic.] she were relieved of her burden. It can also be argued that simple economics dictate that a *risk* to the well-being of any

It is difficult to be certain whether the UK position is compatible with the *PGC*. On the one hand, it could be argued that it is not. The UK position appears to go beyond the presumption defended in 4.3, as it is not concerned with whether the pregnant woman has attempted to avoid getting pregnant in the first place. Thus, no distinction is made between a woman who deliberately got pregnant and later changed her mind because (say) the predicted birth was incompatible with her holiday arrangements, and a woman who took all reasonable precautions and accidentally became pregnant. This appears to be less of a problem in countries such as Belgium where the focus is on the pregnant woman's distress and determination. However, in the UK, in practice, abortion is permitted on demand without detailed consideration of such factors. On the other hand, it could be argued that, when other considerations are taken into account, the UK position is compatible with the *PGC*. Such considerations might include the psychological damage likely to be caused by investigation into the full circumstances of the pregnancy and the consequential effects on the practitioner-patient relationship of restricting early abortion. These factors must be weighed against the moral claims of the early embryo. For present purposes, however, it is sufficient to note that (as the most liberal) the UK position requires more justificatory support than the simple presumption defended above.

In all the countries under consideration, abortion is available for specific reasons beyond the period of gestation given above. Abortion is permitted up to birth where it is necessary to protect the pregnant woman's life in all 17 countries. Indeed, this forms the only ground for abortion in Ireland, where abortion is prohibited unless there is a real and substantial threat to the life of the pregnant woman (see Appendix 1). On the basis of the arguments raised above, I suggest that the Irish position is far too strict, because it appears to disregard any risks to the pregnant woman's basic generic features other than her life (e.g., her mental and physical health), and appears to grant the embryo-fetus full, or almost full, moral status. The relevant constitutional provision even goes so far as to declare the fetus' right to life to be "equal" to that of the mother.²⁵ Examined as if it were an application of the *PGC*, it appears to be far too categorically weighted in favour of the gestational embryo-fetus.

As stated above, the Irish position flows from the constitutional acknowledgment of "the right to life of the unborn." It might be thought that Article 2 of the European Convention on Human Rights could have a similar effect on abortion in signatory states (which include all 15 of the EU

existing members of the family is occasioned by the advent of another mouth to feed. (1999, 116)

²⁵ The Eight Amendment to the Constitution (Article 40.3.3).

countries). The UK has, for example, not only ratified the Convention but also given it circumscribed domestic effect in the Human Rights Act 1998. Article 2 of the Convention provides that "Everyone's right to life shall be protected by law." The ambit of this Article has received some consideration in the Strasbourg jurisprudence. In *Paton v United Kingdom*,²⁶ the European Commission of Human Rights pointed out that the term "everyone" is not defined in the Convention, but noted that the view that the term did not include the embryo or fetus was suggested by general usage and the context in which it is used in the Convention.²⁷ The Commission also noted that the term "life" was not defined.²⁸ Since the issue before the court involved a woman who was only 10 weeks pregnant, however, the Commission felt that it was unnecessary to decide whether the fetus was not covered at all or has a "right to life" with implied limitations. It was held that any interests that such an early fetus might have were overridden by the pregnant woman's right to life and health, as to hold otherwise would give the life of the fetus higher value than that of the woman.²⁹

The Commission returned to this issue in *H v Norway*,³⁰ where a man sought to challenge his former partner's decision to abort their unborn child at 14 weeks on social grounds. The Commission noted that national courts have reached different decisions on whether Article 2 (or equivalent domestic provision) encompasses the fetus: the Austrian Constitutional Court has held that it does not, whereas the German Federal Constitutional Court has held that it does.³¹ Here the Commission avoided the rather strained reasoning adopted in *Paton* and held that the respondent state had not gone beyond the wide discretion granted on this issue.³²

Many other cases recognise the possibility that Article 2 might offer some protection to the fetus, but decline to expand on this, holding it to be unnecessary on the facts in issue.³³ Thus, the full impact of Article 2 on the legality of abortion within signatory states remains largely unaddressed. It is, however, unlikely that Strasbourg will be willing to declare anything but the most extreme abortion provision to be outside the wide discretion granted to national states (i.e., outside their "margin of appreciation").

During the course of enacting the UK Human Rights Act, some MPs suggested that Article 2 could be used by British judges to undermine the

²⁶ (1981) 3 EHRR 408.

²⁷ *Ibid.*, 413.

²⁸ *Ibid.*

²⁹ *Ibid.*, 415-416.

³⁰ (1992) 73 DR 155.

³¹ *Ibid.*, 167.

³² *Ibid.*, 169.

³³ See, e.g., *Open Door Counselling and Dublin Well Woman v Ireland* (1993) 15 EHRR 244.

abortion legislation.³⁴ The Act itself, however, retains the force of incompatible primary legislation.³⁵ Also, in many cases decided since the Human Rights Act came into force, the domestic courts have shown reserve with regard to pre-existing law addressing morally controversial subjects. The common law position on withdrawing nutrition and hydration from patients in a persistent vegetative state has, for example, recently been held to be consistent with Article 2.³⁶ It is submitted that the courts are likely to adopt a similarly conservative approach to Article 2 with regard to abortion, especially in the light of the parliamentary concerns mentioned above and the legislative background on abortion. Thus, in my view, the domestic courts are likely to uphold the existing legal position and hold that the fetus has no legally recognised right to life until birth.

Abortion Following Diagnosis of a Serious Congenital Condition

In many of the countries under study, diagnosis of a serious genetic or congenital condition also provides grounds for abortion. In fact, abortion following such diagnosis is permitted

- (a) up to birth in Austria, Belgium,³⁷ Denmark, France, Germany,³⁸ Italy, and the UK (except Northern Ireland);
- (b) up to 24 weeks in Greece, the Netherlands, and Portugal;
- (c) up to 20 weeks in Finland (by approval of the National Board of Health, otherwise only up to 16 weeks);³⁹

³⁴ See, e.g., 306 HC Deb 828 (16 February 1998), Mr David Ruffley MP.

³⁵ See ss. 3(2)(b) and 4(6). However, "so far as possible," all legislation must be interpreted "in a way which is compatible with the Convention rights": s. 3(1).

³⁶ *NHS Trust A v M; NHS Trust B v H* [2001] Fam 348.

³⁷ The legislation does not provide any time limit on abortions where, if the child were born, it would have a serious and incurable disease. However, during parliamentary discussion the majority stressed that abortion is the ending of pregnancy where the fetus is non-viable (information provided by Herman Nys). At present, there is no jurisprudence on late term abortions where the fetus is viable.

³⁸ The previous law, which permitted abortion for medical indications including hereditary diseases, was modified because it was thought to have implications associated with "eugenics" or, more precisely, associated with the highly immoral acts committed in the name of eugenics by the Nazi. Now, in practice, the risk of serious injury to the woman's mental health is interpreted to encompass abortion following PND, the emphasis being placed on the pregnant woman rather than the fetus. (Information obtained from Eser 2001, para. 37, 1761-1762; and Sabine Michalowski).

³⁹ Ss. 1(5) & 5, Act No. 239/1970. (See Appendix 1).

- (d) up to 22 weeks in Spain, and Sweden (by approval of the National Board of Health and Welfare);⁴⁰ and
- (e) up to 12 weeks in Luxembourg (see Appendix 1).

In some countries, use of PND is limited by other legislative conditions. For example, in France and Germany, PND cannot be used for selecting the sex of the child, except in cases of incurable sex-linked hereditary diseases (see Appendix 1). Moreover, in some countries abortion following PND might also fall within other provisions. For example, under the UK legislation, abortion following diagnosis of the unborn child's sex might sometimes fall within s. 1(1)(a), discussed above. S. 1(2) of the Act states that, in making a determination as to the risk of injury to the woman's or her existing children's health, "account may be taken of the pregnant woman's actual or reasonably foreseeable environment." This seems to make abortion on grounds of sex permissible where the woman is likely to suffer as a result of her cultural environment (e.g., certain cultures value males more highly than females) or where she already has two children of one sex. The morality of such sex selection is explored in 6.2.3, below.

In summary, abortion following the diagnosis of a genetic or congenital disorder is permitted, subject to specific conditions and gestational development, in all the countries under study, with the possible exception of Ireland. Many of the issues relevant to determining the extent to which these variable positions would be legitimate if they were indirect applications of the *PGC* (i.e., "good faith" attempts to apply the *PGC*), will have to be left until the legitimacy of prenatal influence has been analysed (see Chapter Seven). Nonetheless, there are two points that can be made here.

The first is that the presumption defended above, against the use of prenatal testing for incurable late onset disorders, does not appear to be given explicit recognition in the formal regulatory positions of those countries permitting abortion on the grounds of a viable fetus' condition. This is *prima facie* inconsistent with the *PGC*. In practice, it is to be hoped that most countries recognise this presumption.⁴¹

⁴⁰ In Sweden, abortion following diagnosis of fetal abnormality is given no special status under the law. S. 4 of the Swedish legislation states that permission cannot be granted by the National Board of Health and Welfare "if there is a reason to suppose that the embryo is viable." In practice, 22 weeks is usually taken to be the point of viability unless the fetus is very badly damaged. See Appendix 1 for references and more detailed information.

⁴¹ In the UK, e.g., the non-statutory Advisory Committee on Genetic Testing (ACGT) — whose functions have now been transferred to the Human Genetics Commission (HGC)—recommended that presymptomatic children should not generally be tested for late onset disorders and,

Prenatal genetic testing for late onset disorders should only be undertaken in the context of full genetic counselling. (ACGT 1998, 5).

The second point is best explained by examination of the relevant provision in the UK legislation. Under this provision,⁴² abortion is permitted up to birth where

there is a substantial risk that if the child were born it would suffer from such physical or mental abnormalities as to be seriously handicapped.

Under this provision, a "seriously handicapped" unborn child is given far less protection than a non-handicapped unborn child. Nonetheless, the term "seriously handicapped" is not defined and there is no case law on this point.⁴³ This provision is *prima facie* inconsistent with the *PGC* for at least two reasons.

First, this provision appears to treat a "seriously handicapped" embryo-fetus as having less moral status than a non-handicapped embryo-fetus without defining a serious handicap in terms of factors that are relevant to the possession of moral status. As argued in Chapter Two, such factors relate to evidence of present and potential ostensible agency.

In its guidance to practitioners, the Royal College of Obstetricians and Gynaecologists (RCOG) suggest that consideration ought to be given to the following factors "not all of which will be relevant in every case"

- (a) the probability of effective treatment, either *in utero* or after birth;
- (b) the probable degree of self-awareness and of ability to communicate with others;
- (c) the suffering that would be experienced; and
- (d) the extent to which actions essential for health that normal individuals perform unaided would have to be provided by others (see RCOG 1996, para. 3.3.3).

Thus, the RCOG (by implication) suggests that evidence of moral status is relevant (see, e.g., requirement (b)). However, since not all of these factors are thought to be relevant in every case, this definition is wider than one restricted to moral status. The RCOG does assert that

it is not possible to give an authoritative view of the meaning of "seriously handicapped" as this has not been interpreted by the courts. (Ibid.)

⁴² S. 1(1)(d), the Abortion Act 1967, as inserted by s. 37(1)(d) of the Human Fertilisation and Embryology Act 1990.

⁴³ The lack of an authoritative interpretation of the phrase "serious handicap" is addressed in Morgan 1990 and Murphy 1991, 382. LEXIS and Westlaw searches confirm that there is still no case law on this point, but that is hardly surprising given the discretionary power placed in the hands of practitioners under the British legislation. Indeed, according to Mason and McCall Smith, "it is well-nigh impossible to perform an illegal therapeutic abortion in Great Britain" (1999, 156).

Nonetheless, there is nothing preventing the provision from being interpreted to include traits that are irrelevant to moral status, such as Down's syndrome.

Second, the provision grants a "seriously handicapped" embryo-fetus so little protection that neither the pregnant woman nor her family need to be at risk from harm as a result of the birth of such a child. In other words, under this provision there is no need to demonstrate that there is even a conflict between the pregnant woman's generic needs and those of the unborn child. In theory at least, this provision allows a seriously handicapped embryo-fetus' moral status to be overridden by a mere whim, even just before its birth.

Although only 1.1% of the total abortions performed in Britain in 1996 were performed under this section (see Mason and McCall Smith 1999, 115), similar provisions exist in the legislation of many other countries (see Appendix 1). For example, the Finnish legislation permits abortion,

if there is reason to assume that the child would be mentally retarded or would have or would develop a severe disease or physical defect.⁴⁴

This provision appears to be subject to the same criticisms and reservations. In contrast, under the Italian abortion laws, the fetus' abnormalities or malformations are only relevant where they constitute a threat to the woman's mental or physical health (see Appendix 1).

4.4 Preimplantation Genetic Diagnosis (PGD)

It is often contended that PGD is less problematic than PND, because it avoids the thorny and emotive issue of abortion. While PGD avoids the need for gestational abortion in theory, in practice, PGD is usually followed by PND to ensure that the implantation of an embryo with an undesired genotype has been successfully avoided. Moreover, PGD itself raises many additional issues.

Obviously, PGD requires the use of IVF, which is one of many techniques of assisted reproduction. In general, the use of assisted reproductive techniques is paradigmatically justified under the *PGC* where they are necessary to address the inability to participate in the reproductive enterprise, and the affected (ostensible)⁴⁵ agent happens to value the ability to be such a participant. This is quite simply because of the severe damage

⁴⁴ S. 1(5), Act No. 239/1970 as amended. Act translated by Urho Kekkonen (Minister of Social Affairs and Health, Finland).

⁴⁵ For convenience, unless otherwise stated, hereafter I use the term "agent" to refer to an "ostensible" agent.

to a human agent's ability to act or act successfully that can result from involuntary childlessness. Indeed, the empirical evidence suggests that the involuntary childless are likely to suffer generic harm that can be as distressful as grief, emotionally crippling its victims with feelings of inadequacy, loss, anger, and confusion.⁴⁶ Moreover, the empirical evidence suggests that, even where IVF is unsuccessful,⁴⁷ it tends to reduce the suffering of the involuntary childless by leading to acceptance of the condition.⁴⁸ Of course, if the desire to reproduce is the result of misdirected social pressure, then the more appropriate long-term means of preventing this generic harm would be to remove this social pressure, rather than merely granting access to assisted reproduction.

The use of IVF, where it is not necessary to address an inability to reproduce but simply as a means of using PGD to avoid gestating embryos carrying undesired genes or chromosomal abnormalities, is not immoral merely because it involves many otherwise unnecessary risks for a woman who could reproduce unaided. An agent does not have a duty to itself to avoid potential harm to its generic features, as the benefits of its generic rights are waivable (see 1.2.2). Thus, if the objections to PGD made on behalf of the legitimate interests of other possible agents can be answered, the use of IVF will be legitimate. So, it is towards some of these objections that I wish to turn my attention.

PGD is typically used where the prospective parents wish to avoid implanting an embryo with a severe genetic or chromosomal abnormality. What if, however, prospective parents (a) wish to use the technique as a means of identifying a "defective" embryo so that they can implant it or (b) if faced with a choice of a number of embryos, will disregard the fact that some have a specific genetic abnormality? It is often assumed that it is immoral to deliberately implant an impaired embryo, at least where there are non-impaired embryos available for implantation. Is this the case? If, for example, prospective parents have a choice between two embryos, one with Down's syndrome and one without, must they give preference to the one without?

If the genetic or chromosomal abnormality in question is relevant to the embryo's moral status—e.g., the evidence suggests it will prevent the embryo developing further or ever becoming an ostensible agent—then, *all things being equal*, this embryo should not be given the same level of

⁴⁶ For sources, see Menning 1977 and 1980; Hull 1992, 2; Warnock 1985, para. 2.2, 8; Morgan and Lee 1991, 17.

⁴⁷ The live birth rate for IVF, where the gametes are fertilised outside the body, is under 20% per treatment cycle (see HFEA 2000, 11 and 14). The live birth rate for PGD is probably a little lower than for IVF generally (see HFEA and ACGT 1999, para. 17).

⁴⁸ For sources, see Boivin *et al.* 1995, 805; Menning 1977 and 1980; Koropatnick *et al.* 1993, especially 169; Lalos *et al.* 1985.

protection as an apparently healthy embryo. Thus, in such circumstances it might well be immoral to give preference to such a defective embryo over a non-defective one. (Of course, in some situations the effects on the parents might mean that all things are not equal).

If, however, the abnormality is irrelevant to moral status—as in the above example, Down's syndrome—then giving priority to it is not *prima facie* immoral. There might, however, be other reasons not to give preference to it. These might include the effects that this choice will have on existing and future persons with that trait. Since such reasoning applies to any attempt to avoid one's offspring displaying a morally irrelevant trait, this issue will be explored in Chapter Six.

PGD makes it likely that certain oocytes or unimplanted embryos will be discarded. All things being equal, this is something to be avoided. Perhaps, in some cases, the generic harm faced by those who wish to avoid the birth of a child with undesired traits outweighs the harm to the discarded embryos. Even if this is so, the probable harm must be limited as much as possible. Perhaps, there should be a rebuttable, regulatory presumption that rejected embryos are to be donated for either implantation or research purposes tracking generic needs of ostensible agents (see 4.5.1).

PGD, like the PND techniques, also risks the undesired destruction of wanted embryos, as the technique itself involves a risk to its subject. If, however, it is permissible to destroy an embryo with undesired traits then, all things being equal, it will be permissible to allow its destruction as an undesired side-effect of discovering whether it has those undesired traits.

Many issues remain to be considered. Issues relevant to all the techniques of prenatal influence will be explored in Chapter Six. It would appear that if attempts to influence traits before birth are permissible, then PGD is a less problematic means of achieving this goal than many other means, at least it will be when it becomes accurate enough to avoid the need for result confirmation via PND. When the technique becomes more accurate, it would appear less problematic than the use of PND to achieve the same end, as the subject has less moral status. Moreover, since the technique is a prerequisite for germ-line gene therapy, it would appear to raise fewer issues than germ-line gene therapy, unless gene therapy is performed merely as a means of avoiding the destruction of any embryos.

4.4.1 Regulation of PGD

There is no consensus for or against genetic diagnosis of the unimplanted embryo.⁴⁹ Consequently, all four regulatory approaches towards PGD are

⁴⁹ In this section, unless otherwise specified, I use the term PGD to refer to genetic diagnosis of the unimplanted embryo.

displayed by the countries under study. These approaches are shown as in Table 1, below.

Countries whose legislation permits PGD vary greatly in their level of permissiveness. Detailed tabulated information on these laws can be found in Appendix 2, alongside full citation of the relevant legislation and legislative provisions.

Table 1

	<i>by legislation</i>	Denmark Spain	France UK
<i>Permitted</i>			
	<i>in the absence of legislation</i>	Belgium Finland Italy Netherlands US	Canada Greece Portugal Sweden
	<i>by legislation</i>	Austria	Germany
<i>Prohibited</i>			
	<i>in the absence of legislation</i>	Ireland	
<i>Unknown</i>	Luxembourg (no PGD is performed)		

The UK licensing authority, the Human Fertilisation and Embryology Authority, in accordance with the permissive legislation under which it operates, has licensed four centres to undertake PGD and its associated research (see HFEA and ACGT 1999, para. 11). It has also issued a Code of Practice, which provides that licensed clinics should not select the sex of embryos for social reasons.⁵⁰ Failure to comply with this Code of Practice will expose the clinic to the risk of losing its licence.⁵¹ Not surprisingly, it appears that licensed clinics comply with the prohibition on sex selection for social reasons. Only recently a couple, who had lost their three-year-old girl in a bonfire accident, failed to gain access to PGD to provide a sister for their four boys.⁵²

The Code of Practice also asserts that licensed centres "should not use sperm sorting techniques in sex selection" (HFEA 2001, para. 9.10).

⁵⁰ This advice appeared in its last *Code of Practice* (see HFEA 1998, para. 7.20, 45) and is re-asserted in the recently issued fifth edition (see HFEA 2001, para. 9.9).

⁵¹ S. 25(6), Human Fertilisation and Embryology Act 1990.

⁵² The HFEA's decision was widely reported, see e.g., Scott 2000. For further details see 6.2.3, above.

Although not strictly a PGD technique,⁵³ sperm sorting is another means of selecting a future child's sex before implantation in the womb. It is, however, questionable whether the licensing authority has any legal basis for asserting or enforcing its prohibition of sperm sorting. The UK legislation does not require a licence for the use of non-stored gametes where "the services are being provided for the woman and the man together."⁵⁴ Thus, no licensed activity is performed where sperm sorting precedes artificial insemination in a woman receiving treatment with the sperm provider. It surely follows that the licensing authority cannot enforce this prohibition against the clinics that it licences and it certainly cannot enforce it against clinics that perform no licensed activities.⁵⁵

Other than the two Code of Practice provisions on sex selection mentioned above, the HFEA does not currently provide a list of conditions for which PGD is permitted. The decision is left for the clinical team to consider with individual patients. However, in practice

centres are understood to be applying the criteria for termination of pregnancy for fetal abnormality published by the Royal College of Obstetricians and Gynaecologists (RCOG). . . . This limits the use of PND to cases where there is a precise diagnosis and a "substantial risk" of "serious handicap." (HFEA and ACGT 1999, para. 34, 10)

These conditions have already been examined in 4.3.2, above.

The Spanish legislation expressly permits the use of assisted reproduction for the prevention and treatment of illnesses of a genetic or

⁵³ If PGD is defined as genetic diagnosis of the oocyte or unimplanted embryo (as in 3.4.1) or if PGD is restricted to genetic diagnosis of the unimplanted embryo (as above).

⁵⁴ S. 4(1)(b), Human Fertilisation and Embryology Act 1990.

⁵⁵ The Human Fertilisation and Embryology Act imposes a licensing requirement on the

- (a) creation of an embryo outside of the body (ss. 3(1)(a) & 1(2));
- (b) storage or use of *in vitro* embryos (ss. 3(1)(b) & 1(2));
- (c) storage of gametes (s. 4(1)(a)); and
- (d) use of gametes, unless "services are provided for the woman and man together" (s. 4(1)(b)).

These provisions have other implications. It also follows that genetic diagnosis of oocytes provided by the woman of a couple receiving treatment services together only falls within the Act if the oocytes are stored. S. 2(2) provides that references "to keeping, in relation to embryos or gametes, include keeping while preserving, whether preserved by cryopreservation or in any other way." Since this does not purport to provide an exhaustive definition of "storage," in some cases where gametes have not been preserved it is difficult to be certain about whether the Act applies.

hereditary origin.⁵⁶ However, s. 13 prohibits genetic selection for or against "non-pathological" characteristics. The Spanish position is, therefore, slightly more restrictive than the UK's. Similarly, in Denmark the genetic examination of an embryo is expressly permitted where there is "a known and considerable risk" of "a serious hereditary disease" or to determine whether the embryo has "an important chromosome abnormality."⁵⁷ The Danish legislation does, however, prohibit the sex selection of sperm or fertilised eggs, except to prevent a serious sex-linked hereditary disease.⁵⁸ (The morality of sex selection is explored in 6.2.3, below.)

An example of a prohibitive legislative approach can be found in the German Embryo Protection Act (EPA) 1990. Under the EPA, it is an offence to fertilise a human egg for any purpose other than to start a pregnancy in the woman who produced the egg.⁵⁹ Also, it is an offence to produce or remove an embryo for a purpose not serving its preservation,⁶⁰ and an embryo is defined to include any totipotent cell removed from an embryo that is assumed to be able to divide and develop into an individual.⁶¹ This has led many commentators to suggest that the EPA does not forbid diagnosis of cells after they lose their totipotency.⁶² Nevertheless, the clear intention of the EPA was to prohibit PGD and, in 1996, an application to conduct Germany's first PGD trial was rejected by a local ethics committee on legal grounds. Nonetheless, the application of screening or diagnostic techniques to gametes does not appear to fall within the terms of the Act. There is one notable exception; sperm cannot be selected for their sex chromosomes unless this has been done to avoid Duchenne-muscular dystrophy or a similarly severe sex-linked genetic illness.⁶³

Whether PGD is acceptable in countries that do not have any specific legislation depends on that country's general legal and cultural framework. For example, genetic diagnosis of the unimplanted embryo is implicitly prohibited in Ireland by the Eighth Amendment to the Constitution.⁶⁴

Many other countries do not have legislation or constitutional provisions addressing PGD. For example, in Belgium, Greece, Italy, the Netherlands,

⁵⁶ S. 1, Act 35 of November 1988. S. 12(1) explicitly authorises PGD to test for hereditary diseases in order to treat them or advise against transfer to the womb.

⁵⁷ S. 7, Law No. 460 of 1997. English translations from International Digest of Health Legislation 1997.

⁵⁸ S. 8, Law No. 460 of 1997.

⁵⁹ S. 1(1)(2).

⁶⁰ S. 2(2).

⁶¹ S. 8(1).

⁶² According to information provided by Hille Haker, some scientists hold that on the third day (when biopsies for PGD are usually made) no totipotent cells exist; others, such as Regine Kollek, consider the cells totipotent at the 6-10 cell stage.

⁶³ S. 3.

⁶⁴ Ireland is in the process of considering new legislation (see Appendix 2).

and Sweden, PGD is permitted by default.⁶⁵ Less formal regulatory mechanisms are often used.⁶⁶ For example, in Italy the Ethical Code of Practice 1998—which has uncertain legal force⁶⁷—restricts genetic tests to diseases and requires certain information to be offered to the person undergoing the test.⁶⁸ Also, the Swedish Parliament has declared (without adopting any legislation on the matter) that PGD should be permitted only for the diagnosis of serious, progressive hereditary disease that leads to premature death and for which there is no cure or treatment. This position has been reiterated by the National Board of Health and Welfare, which stresses that PGD cannot be considered part of routine health care.⁶⁹

Countries that have signed and ratified the European Convention on Human Rights and Biomedicine will, however, have to take account of Article 14, which declares,

The use of techniques of medically assisted procreation shall not be allowed for the purpose of choosing the future child's sex, except where serious hereditary sex-related disease is to be avoided.

None of the relevant countries have raised reservations with regard to this provision. (The morality of sex selection is explored in 6.2.3). Also, Article 12 declares that predictive genetic tests “may be performed only for health purposes or for scientific research linked to health purposes.”

The Convention can also be signed by those non-member countries who were granted observer status during discussions, including the US and Canada.⁷⁰ Nonetheless, neither these countries nor Austria, Belgium, Ireland, Germany, the UK have yet signed the Convention.⁷¹ In fact, so far only four of the 17 countries under study have ratified the Convention, namely, Denmark, Greece, Portugal, and Spain.⁷²

⁶⁵ Portugal has constitutional provisions, introduced in the Fourth Revision of 1997, that might affect the legality of PGD, see 6.3.2. For the other countries, see Appendix 2.

⁶⁶ Also, proposed legislation is under consideration in many of these countries, see Appendix 2.

⁶⁷ Its legal force is widely regarded as an open question. Interestingly, a recent judicial sentence (Tribunale di Roma, 14 February 2000, Judge Chiara Schettini) recognised the right of a couple to have access to a surrogate mother, notwithstanding a contrary provision of the Ethical Code of Practice. (Information provided by Roberto Mordacci.)

⁶⁸ Information provided by Roberto Mordacci.

⁶⁹ Information provided by Elisabeth Rynning. See also Appendix 2.

⁷⁰ Article 33(1). For a discussion of the possible reasons why Canada has not signed the Convention, despite being directly involved in its framing, see Molinari 1998.

⁷¹ See <http://conventions.coe.int/treaty/EN/cadrepincipial.htm>.

⁷² The Convention does not provide for any enforcement mechanism. Article 29, however, provides that the government of a party to the Convention may ask for the

Given the non-definitiveness of the conclusions reached above, evaluation of these laws will, in the main, have to be left for a later stage. Nonetheless, on the basis of the reasoning regarding incurable late onset disorders set out above (4.3), there must be at least a *prima facie* presumption that PGD will not be permitted to test for such disorders. Also, where PND is permitted PGD should be permitted, and where PGD is permitted, the conditions for which it can be used should be restricted.

4.5 Research and Experimental Treatment on the Embryo-Fetus

Embryo-fetal research and manipulation can be conducted on the preimplantation (*in vitro*) embryo or on the embryo-fetus in the womb (*in utero*). Such research (especially on *in vitro* embryos) is widely thought to be necessary for the development and improvement of many techniques of prenatal influence. Also, if a live birth results, then prenatal manipulation of the embryo-fetus is paradigmatically a potential method of influencing the traits of a future child directly.

It is important that I clarify some terminological matters before continuing. The phrase “experimental treatment” will be used to cover experimental manipulation of an embryo that is for the direct benefit of that specific embryo. The term “research” is, therefore, restricted to all *other* experimental manipulations on the embryo-fetus. It follows from this that Austria and Germany are correctly characterised as prohibiting *in vitro* embryo research, even though they permit experimental treatment on embryos (see 4.5.2, below).

Even experimental treatment, which aims to benefit the embryo-fetus directly, must treat its subject in a way compatible with its moral status. This includes the status that the embryo-fetus will have in the future, as it is (*ex hypothesi*) intended to manifest its full potential. Thus, it will not be permissible to experiment on the embryo-fetus in a way that is likely to damage its future generic abilities. It might, however, be permissible to conduct experimental treatment that (a) is the only or best means of preventing future generic harm, (b) has a high probability of success, and (c) does not involve the violation of duties to morally relevant others. Where the experimental treatment is all or nothing, so that the embryo-fetus will either benefit or die in the process, the earlier its development the easier this will be to justify, simply because of its gradualist moral status.

4.5.1 Embryo-Fetal Research

Research on the embryo-fetus will be permissible only insofar as it is permissible to manipulate and destroy the embryo-fetus. The strongest case for research is where it is necessary to protect the basic generic features of an ostensible agent. I have already argued (4.4) that involuntary childlessness is capable of causing basic generic harm to human ostensible agents who wish to participate in the reproductive enterprise, and assisted reproduction can significantly reduce the risk of this harm. Thus, if such research is necessary for the maintenance and development of the techniques of assisted reproduction or the prevention of infertility, then it is arguably permissible, at least where it is performed on an early embryo and the subject is not treated as a valueless thing.

Other purposes for which research might be necessary include investigation into the causes of early spontaneous abortion,⁷³ contraceptive research,⁷⁴ and the development or improvement of many genetic and reproductive techniques. Where this research is necessary to protect the basic generic features of ostensible agents, use of the early embryo is *prima facie* justified. The moral defensibility of such research is suggested by the considerations outlined at the beginning of this chapter. Not all research is, however, compatible with these considerations. Unnecessary experiments and those performed purely for commercial gain or scientific prestige usually involve treating an embryo as if it has no moral status. An early embryo has less intrinsic moral status than a healthy adult rat, but it does have moral status.

There is a great deal of controversy over whether, if it is justified at all, research ought to be restricted to embryos that are left over from IVF treatment ("surplus embryos"), rather than conducted on embryos specifically created for the purpose. For example, the Canadian Discussion Group on Embryo Research was of the opinion that,

It is unacceptable to subject women to any increased risk or reduced medical benefit (including a reduced likelihood of pregnancy) in order to procure ova or embryos for research. (Discussion Group on Embryo Research 1995, 6)

My thesis is that all moral conclusions must be supportable by the *PGC*. Where, however, the woman has voluntarily consented to this increased risk,

⁷³ According to Eisenberg and Schenker (1997, 12), 10-15% of clinically recognised pregnancies terminate in spontaneous abortion and up to 60% of fertilisations do not last long enough to cause a missed menstrual period.

⁷⁴ The importance of research into contraceptives is suggested by the high demand for abortion, the risks of unsafe abortion, and the destructive effect that unwanted children can have, especially on those at subsistence level.

since the benefits of all her generic rights⁷⁵ are waivable, the argument presented by the Canadian Discussion group is to be rejected.

The Discussion Group also employed other arguments against the creation of embryos for research. It dismissed such a practice as

tantamount to treating the viable human embryo like a tissue culture, because of their numbers and because there would be no chance of their gestation into personhood. We would find these scenarios totally unacceptable. (Discussion Group on Embryo Research 1995, 18)

If embryos are created for research without regard to the necessity of the research, the potential benefits of the research, or the likelihood of the research manifesting these benefits, then it will, indeed, be the case that the embryo is being treated like a tissue culture. Where, however, this is not the case, the embryo is not being treated as a valueless thing. It *might* still be impermissible to do research on the embryo, but this is something that must be shown. The *presumption* must be in favour of early *in vitro* embryo research where it is necessary to protect the basic generic features of ostensible agents (see below).

In contrast, due to the greater moral status of the developing fetus, no such presumption should operate in favour of research on the fetus. Where, however, the pregnant woman has, for other reasons, decided to abort the fetus within the constraints of the *PGC*, the case for allowing research on it is stronger.⁷⁶ Of course, mechanisms must be put in place to ensure that the woman's decision to abort is not connected to the desire to research on the aborted fetus and to ensure that the fetus is not used in a way likely to add to the woman's distress.

There are a number of potential sources of embryos for research, including surplus embryos left over from assisted reproduction by IVF, defective embryos that cannot be used for IVF, aborted embryos obtained by flushing methods (induced or spontaneous abortion), and embryos created for the purpose of research (see Eisenberg and Schenker 1997, 12-13). Of the embryos used for research purposes in the UK between August 1991 and March 1998, 48,444 were surplus after IVF treatment and 118 embryos were created in the course of the research (see Department of Health 2000a, Table 2, 32). An additional 237,603 embryos created by IVF were not used for any purpose and destroyed (*ibid.*).

Given the arguments presented so far, those embryos displaying the least actual and potential evidence of agency will be the ones on whom research is

⁷⁵ I am, of course, assuming that the woman is an ostensible agent.

⁷⁶ This book does not address the regulation of fetal research and experimental treatment on fetuses. It is, however, interesting to note that in some US states "research is forbidden on an aborted child or its remains" (Andrews 2000, A-5).

easier to justify. Unfortunately, it is likely that *defective* embryos obtained from IVF or abortion won't be adequate for some research purposes. Indeed, even surplus embryos are not adequate for some research projects,

Research involving the creation of human embryos is needed particularly in the development of techniques involving gamete manipulation, such as intracytoplasmic sperm injection (ICSI) with immature sperm, in order to determine that normal fertilization and embryonic development is likely to result. Allowing research on spare embryos, which have been created for treatment purposes, is not appropriate for this type of research, which nevertheless underpins the safety of assisted conception techniques. (Gunning 2000, 432)

Thus, a blanket prohibition of creating embryos for research, irrespective of the purpose of the research, would be problematic from the point of view of the *PGC*.

One point that must be kept in mind is that the use of *any* embryos for research can only be justified if the alternatives involve a greater risk of violating the *PGC*. Thus, it needs to be asked what other uses embryos could be put to. With regard to surplus embryos, John Harris (1998a, 60–63) argues that if it is permissible to destroy them, then *ipso facto* it is permissible to use them for research. While this seems plausible, given that their destruction involves the most basic generic harm that could be inflicted on them (if they are in fact agents) there are other possible alternatives to be considered. For example, embryos left over after IVF, or created for research, could be used to alleviate some of the distress faced by those who are involuntarily childless. Thus, it might be the case that it is permissible (or even required) for access to IVF to be conditional upon donation of surplus embryos to the involuntarily childless. My point is that it does not follow from the fact that it was permissible to allow the creation of surplus embryos (as an undesired side-effect of IVF treatment), that these embryos can be treated as non-agents.

Since research is easier to justify on the early *in vitro* embryo than on the embryo-fetus at a later stage, the next sub-section will explore the regulation of *in vitro* embryo research.

4.5.2 Regulation of *In Vitro* Embryo Research

Given the well-known divergence of views on embryo research, it is no surprise to discover that the regulatory approaches of the EU countries,

Canada, and the US are far from uniform. In fact, all possible regulatory approaches can be seen, as shown in Table 2, below.⁷⁷

Detailed tabulated information on these laws is presented in Appendix 3, along with full citation of the relevant legislation and legislative provisions.

Table 2

	<i>by legislation (subject to conditions)</i>	Denmark France (exceptionally if non-impairing)	Finland Spain Sweden UK
<i>Permitted</i>	<i>in the absence of legislation</i>	Belgium Greece Netherlands US	Canada Italy Portugal
<i>Prohibited</i>	<i>by legislation</i>	Austria	Germany
	<i>in the absence of legislation</i>	Ireland (constitutional provision)	
<i>Unknown</i>	Luxembourg (no legislation and no embryo research is performed)		

A minority of countries—Austria and Germany—prohibit *in vitro* embryo research by legislation. In these countries, procedures on embryos are prohibited for any purposes other than to achieve a pregnancy with that embryo or to maintain/promote its healthy development. This approach, prohibiting research no matter how vital the interests it tracks, seems to grant too much protection to the early embryo. This is tantamount to treating the early embryo as if it has full moral status, especially since non-impairing research is prohibited (cf. France, below).

All countries permitting research by legislation explicitly restrict it to within the first 14 days after fertilisation, except France. Although the French legislation does not specify a time limit,⁷⁸ since it only permits

⁷⁷ For discussion of whether it is desirable or possible to harmonise the regulatory approaches towards embryo research adopted in the EU countries, see Beylveled and Pattinson 2001.

⁷⁸ Information provided by Pierre Langeron. Cf. MacKellar 1997, 9; European Parliament 2001a, 16; European Parliament 2001b, 5, which assert that there is a seven day restriction.

research on embryos if it does not impair the embryo,⁷⁹ in practice, the French legislation restricts research to well within 14 days. A 14 day limit is somewhat arbitrary. We have seen that the gradualist moral status of the embryo does not create bright line divisions between different gestation stages. Moreover, there are many other gestational stages that are more significant in terms of the embryo-fetus' display of agency-related evidence, such as the first signs of a developing nervous system displayed by rudimentary electrical signalling between groups of cells at about six or seven weeks. There are, however, a number of other considerations. First, as long as embryos cannot be sustained for longer periods outside of the body, the issue is of little practical significance. Second, the regulation of embryo research does not occur in a socio-political vacuum and a 14 day threshold has the benefit of being clear and attracting widespread support. Nonetheless, a threshold without exceptions, or means of creating exceptions, is *prima facie* indefensible.

All these countries prohibit the creation of embryos for research, except the UK.⁸⁰ Denmark might also appear to permit the creation of embryos for research (but only for the improvement of IVF or similar techniques and PGD).⁸¹ However, the European Convention on Human Rights and Biomedicine must be taken into account with regard to those countries that have signed and ratify it.⁸² Although this Convention does not prohibit embryo research, Article 18(1) states,

Where the law allows research on embryos in vitro, it shall ensure adequate protection of the embryo.

The term "adequate protection" is not defined, but Article 18(2) prohibits the creation of embryos for research.⁸³

Although Article 36 of the Convention allows countries to invoke their pre-existing law to make a reservation to modify or avoid being bound by certain of its provisions, none of the four countries that have ratified it—

⁷⁹ Article L. 152-8 of the Public Health Code.

⁸⁰ Note the definition of "embryo" under the UK Human Fertilisation and Embryology Act 1990, discussed in 5.4, below.

The proposed legislation in Belgium and Luxembourg also prohibits the creation of embryos for research (see European Parliament 2001b, 4).

⁸¹ S. 25, Law No. 460 of June 1997.

⁸² See <http://conventions.coe.int/Treaty/EN/CadreListeTraites.htm> for information on signatures and ratifications, discussed below.

⁸³ According to Zilgalvis (2001, 42),

an additional Protocol on the Protection of the Human Embryo and Foetus is under preparation by a working party under the authority of the CDBI [i.e., the Council of Europe's Steering Group on Bioethics].

Denmark, Greece, Portugal, and Spain—have made reservations with regard to embryo research. It follows that the creation of embryos for research is now prohibited (in international law at least) in Denmark, Greece, and Portugal.⁸⁴ As indicated in 4.5.1, such a blanket prohibition to the creation of embryos for research is difficult to reconcile with the *PGC*.

Where embryo research is permitted by legislation, the purposes for which it is permitted are prescribed (see Appendix 3). Finland is the most liberal as all research is permitted except for genetic modification and, even then, it is permitted if the aim is to prevent or cure a serious hereditary disease. Although the Spanish legislation restricts research on *viable* embryos to diagnostic, therapeutic or prophylactic purposes where the "non-pathological genetic patrimony is not modified,"⁸⁵ it is more liberal with regard to non-viable embryos. Research is permitted on non-viable embryos for ten specified purposes.⁸⁶ These purposes are similar to those permitted in the UK for all embryos, where research must be "necessary or desirable" for promoting advances in the treatment of infertility, congenital disease, miscarriage, contraception, or gene/chromosome abnormalities.⁸⁷ Both Spain and the UK allow these purposes to be extended—by regulation in the UK and by regulation or the Multidisciplinary National Committee in Spain. However, in the UK, the purposes that may be added are restricted to research that would "increase knowledge about the creation and development of embryos, or about disease, or enable such knowledge to be applied".⁸⁸ On the recommendation of various bodies,⁸⁹ the UK has recently passed relevant secondary legislation to extend the purposes for which research can be performed to include increasing knowledge about the development of embryos and about serious disease, and enabling such knowledge to be applied in developing treatments for serious disease.

Denmark will only allow research for the improvement of IVF (and similar techniques) or PGD.⁹⁰ France, the least liberal country permitting research by legislation, only permits research "exceptionally" for the direct benefit of the embryo itself or to improve the techniques of assisted reproduction.⁹¹ All research must not impair the embryo.⁹² However, since the vast majority of research that is useful for the advancement of assisted reproduction is likely to harm or impair the embryo, the French legislation is

⁸⁴ It was already prohibited in Spain.

⁸⁵ S. 15(2), Law 35 of November 1988.

⁸⁶ Specified in s. 16, Law 35 of November 1988.

⁸⁷ Schedule 2, para. 3(2) of the Human Fertilisation and Embryology Act 1990.

⁸⁸ Schedule 2, para. 3(3) of the Act.

⁸⁹ See HGAC and HFEA 1998b, para. 9.3, and the report of the Chief Medical Officer's advisory committee: Department of Health 2000a, para. 5.10, 45.

⁹⁰ S. 25, Law No. 460 of June 1997.

⁹¹ Article R 152-8-1 to 12, Public Health Code.

⁹² Article L. 152-8, Public Health Code.

effectively allowing the moral status of the embryo to override the moral interests attached to the possible benefits of research, including the interests of the involuntary childless.

Where no specific legislation has been enacted, *in vitro* embryo research is often addressed by other legal means (such as constitutional provision) or non-legal means (such as professional guidelines). In Ireland, for example, the Medical Council's ethical guidelines require any fertilised egg to be implanted and prohibit the creation of embryos for research. Additionally, the Eighth Amendment to the constitution implicitly prohibits embryo research by declaring that,

The State acknowledges the right to life of the unborn and, with due regard to the equal right to life of the mother, guarantees in its laws to respect, and, as far as practicable, by its laws to defend and vindicate that right.

Consequently, in Ireland, no research is being conducted on human embryos.⁹³

In contrast, in Belgium, Canada, Italy, the Netherlands, and Portugal⁹⁴ and the US,⁹⁵ research has been conducted despite the absence of any relevant legislation. All these countries have proposed legislation at various stages of consideration (see Appendix 3).

It might be thought that the European Convention on Human Rights might also have an effect on embryo research, especially in the UK where it has been given circumscribed domestic effect by the Human Rights Act 1998. Article 2 of the Convention provides that "Everyone's right to life shall be protected by law." However, the Strasbourg jurisprudence grants a wide discretion to national states and does not conclusively determine whether Article 2 encompasses the fetus (see 4.3.2). The relevance of the sparse case law is also complicated by the abortion issue, which pits whatever interests the fetus has against the pregnant woman's. On the one hand, *in vitro* embryo research is less problematic because such an embryo is separate from the woman's body. On the other hand, Article 2 is likely to grant less status to the early embryo than it grants to the early fetus and the early fetus appears to be granted little or no protection.⁹⁶ If addressed

directly, it is likely that the Strasbourg courts will leave the issue to the discretion of the individual states.

At this stage operating only on non-definitive conclusions, I suggest that the approaches of Austria, Germany, and France are harder to justify than that of the other countries under consideration. Where, however, embryo research is permitted, it would appear that the purposes for which it is permitted should be heavily proscribed, so perhaps the extremely permissive stance of the Finnish legislation goes too far in the opposite direction. Also, I have suggested that prohibiting the creation of embryos for research, irrespective of the purposes for which such research is necessary or useful, appears to be too restrictive to be compatible with the requirements of the PGC.

4.6 Conclusion

Since many key issues have been left until later, this chapter does not go very far towards addressing the permissibility of prenatal influence and the adequacy of current attempts to regulate its practice. Unfortunately, this is the nature of the project as the issues are by no means simple and even tentative presumptions cannot be established without exploring the full complexity of the debate.

The next chapter will examine the moral issues raised by the regulation of cloning and prenatal gene therapy (the latter encompassing both somatic and germ-line gene therapy).

⁹³ See Appendix 3 for references and more detailed information.

⁹⁴ Some provisions of the Fourth Revision of the Constitution might, however, affect the legality of embryo research, see 7.4.2.

⁹⁵ Until recently the US prohibited the federal funding of all embryo research. This has since been modified. In August 2001, President Bush announced that federal funding will be available for stem cell research on existing cell cultures, but would not be available for research on stem cells not derived from embryos already existing at the time of the announcement (see Fletcher 2001).

⁹⁶ The limited case law is concerned with the early fetus and emphasises the early gestational stage.

Chapter 5

Regulation of Genetic and Reproductive Techniques II: Cloning and Prenatal Gene Therapy¹

We have seen that many techniques enable parents to influence traits before birth, but only some of these are currently feasible and generally legal. This chapter concentrates on two of the most controversial—cloning and prenatal gene therapy. As with the previous chapter, I will analyse the regulatory mechanisms that have been adopted, or are likely to be adopted, in the EU countries, Canada, and the US, with particular emphasis on the UK. The approach of this chapter will, however, be somewhat different to that of the previous chapter. Since both cloning and germ-line gene therapy are widely rejected as immoral, requiring legislative prohibition, this chapter will focus on the arguments that have been cited for and against these techniques. I will argue for *prima facie* presumptions in favour of permitting use of these techniques in specifiable circumstances.

5.1 Cloning Humans

Since the creation of Dolly the sheep in February 1997, the possibility of a cloned child is frequently revisited by the media who seem keen to re-ignite public fears. There is, it seems, a widely held view that cloning a human being would be immoral.

Before exploring the arguments underpinning such views, I wish to clarify two points about my use of “cloning” and related terms. First, unless otherwise indicated, I use the term to refer to the deliberate creation of a human being that is genetically identical to another human being or has the same nuclear gene set as another human being (see Chapter Three, especially 3.4.2). Second, since my focus is on the use of cloning technology to influence traits before birth, I restrict my comments to what is often termed

¹ An earlier version of the information—used in sections 5.4 and 5.8—on the regulation of cloning and prenatal gene therapy in the EU countries was presented in Beylveled and Pattinson 2000b.

"reproductive" cloning, i.e., cloning aimed at producing a child.² Even when defined so narrowly, cloning attracts many different regulatory responses and ethical views. Many of which seem to be formulated in the belief that the age of widespread human cloning is nearly upon us.

Predicting the future of nascent technology is a path littered with traps. One only has to read the words of two well respected developmental biologists 13 years before the creation of Dolly the sheep: "[t]he cloning of mammals, by simple nuclear transfer, is biologically impossible" (McGrath and Solter 1984).³ Nonetheless, it does appear to be only a matter of time before the most controversial cloning technique, nuclear transfer, is used to create a human child. This seems to be a widespread view. For example, Panos Zavos and Severino Antinori recently announced an intention to use the technique to create a human clone by late 2002 (see Borger 2001, 1). Not surprisingly, this announcement elicited a dramatic media response.

Our purpose here is to take a less impassioned view by addressing the major arguments against cloning, before turning to arguments seeking to support use of the technique.

5.2 Arguments Against Cloning

Developments such as the creation of Dolly the sheep have provoked a fusillade of claims to the effect that the application of the technique to humans would be immoral and ought to be prohibited. Many of these arguments also apply to other techniques of prenatal influence. Arguments tracking the goal—prenatal influence—rather than cloning as a specific means of achieving this goal will be explored in Chapter Six. Such arguments include variants of the slippery slope argument, such as those asserting that cloning will be abused causing a slide towards impermissible "eugenic" selection. Chapter Six will also address those arguments invoking a conception of human dignity, such as those denouncing cloning as involving the use of human beings as a mere means, rather than ends-in-themselves.

Some more specific arguments seem rather *ad hoc*, designed solely to support the intuition that there is something immoral about cloning.⁴ One

² See HGAC and HFEA 1998a, para. 1.3

³ For a wider discussion of the history of cloning, see Kolata 1998.

⁴ Andrea Dworkin argues that "[c]loning is the absolute power over reproduction that men have wanted and have destroyed generations upon generations of women to approximate" (1998, 76). However, cloning a human using the Dolly technique would enable a child to be born without the involvement or contribution of a man (other than the man who was originally the genetic father of the person from whom the source material derives).

that can be quickly rejected is the argument that cloning would undermine genetic diversity. Firstly, this is highly unlikely given the number of human beings in the world and the high cost of cloning. Secondly, even if cloning did become so widespread that genetic diversity was threatened, whose rights would this violate? Under the *PGC*, there can be no duty to further the human race because of the implications and burdens of such a duty.⁵ Just as there can be no duty to reproduce, there can be no duty to ensure that there is widespread genetic diversity. Interestingly, if specified too widely, such a duty would actually require the use of germ-line gene therapy to increase the level of genetic diversity in the population; something that is unlikely to appeal to supporters of this argument.

In some ways not all cloning techniques are equivalent. A distinction between cloning techniques is suggested by the arguments of Chapter Two. Since moral status is proportional to development, cloning techniques might appear distinguishable according to the developmental stage of their subjects. We have seen that under precautionary reasoning, all things being equal, an early embryo has (marginally) greater moral status than a gamete or somatic cell. Thus, if cloning is taken to involve the destruction of its subjects, then the Dolly technique is less problematic than embryo splitting. However, the Dolly technique raises moral concerns not raised by embryo splitting, particularly those centred on the cloning of an existing adult (including its potential for making parents of persons without their knowledge or consent), and the scientific uncertainties of the technology.

Further, many of the arguments against cloning were presented after the arrival of Dolly the sheep and were concerned with that technique. For this reason, unless otherwise made clear, the following discussion will focus on nuclear transfer techniques. Commonplace examples of arguments presented against their application to humans include claims that it would violate a person's right to genetic individuality, selfhood, a unique identity, or two biological parents.⁶ According to Jim McLean (1998, 26) "[a]n artificially cloned human being would have been denied the right to be the product of a genetic blueprint having two different sources." Related arguments are presented in the resolution on human cloning passed by the European Parliament in January 1998, which declares that "every individual has the right to his own genetic identity and . . . human cloning must be prohibited."⁷

⁵ Note, e.g., the provisos attaching to positive rights. See 2.7, above.

⁶ With the exception of the right to have two biological parents, these alleged rights will apply to all cloning techniques.

⁷ Resolution on Human Cloning, 15 January 1998 (see the website of the European parliament at <http://www.europarl.eu.int>). This statement also appeared in the earlier resolution on cloning animals and human beings of 12 March 1997 (see Bulletin of Medical Ethics 1997).

There are a number of obvious limitations and problems with such arguments. One is that any "right to genetic individuality," etc. would appear to apply to identical twins. Cloned humans would effectively be time-delayed twins, being less identical to each other than naturally occurring identical twins, because of their different intrauterine environment and different mitochondrial DNA.⁸ McLean claims that his "right" is not violated by the existence of identical twins because "each monozygotic sibling still draws its genetic blueprint from two sources, two parents not one" (1998, 26). However, a clone would have at least two different sources of genetic material, namely, the genetic parents of the nuclear DNA donor.⁹ With regard to other asserted "rights"—such as the right to genetic individuality—it might be claimed that it is *deliberately* bringing about the existence of a clone that is wrong (see, e.g., Brock 1998, 152). Insofar as this distinction requires a separation of acts and omissions it is at least *prima facie* problematic under the PGC. Moreover, the fact that one is genetically identical (or very nearly genetically identical) to another does not (by itself) prevent individuality or harm one's generic features.

Such arguments do, however, raise a key question—can cloning be a violation of the clone's rights? Can our duties to the clone itself include a duty not to create it? This question raises issues that are relevant to many arguments for or against cloning.

5.2.1 Can the Clone be Harmed by its Mere Creation or Birth?

The argument that a wrong can be done to a child by its mere creation or birth is one possible justification for private law actions commonly referred to as "wrongful life" actions (see Pattinson 1999). Despite not being concerned with private law mechanisms triggered by the birth of a child with undesired traits or prospects, this book cannot ignore this argumentative strategy. For convenience, I will address this issue in the abstract before returning to the issue of cloning. In the abstract, the issue is whether merely allowing or causing the conception or birth of a child can ever constitute a wrong to that child. Applied to cloning, the issue is whether the use of a cloning technique can constitute a wrong to the resultant clone.

Stated in this way, the claim that a wrong has been done might appear to be implausible and not worth discussing. It is, however, a claim that is presupposed by many arguments against cloning.

⁸ If clones produced by embryo splitting are implanted at the same time, then they would also share the same intrauterine environment and mitochondrial DNA. Thus, McLean's alleged right must be addressed at the Dolly technique.

⁹ Also, with the Dolly technique the clone might have different genetic parents providing the nuclear and mitochondrial DNA.

A wrong might have been done to such a child if it has been harmed. However, many philosophers have questioned whether a child could be harmed by conduct causing it to be conceived or born where the only alternative was for it not to have been conceived or born.

This raises an objection referred to by Parfit as the "non-identity problem." This objection is, perhaps, best conveyed using one of Parfit's thought experiments involving a 14-year-old girl.

The girl chooses to have a child. Because she is so young, she gives her child a bad start in life. Though this will have bad effects throughout this child's life, his life will, predictably, be worth living. If this girl had waited for several years, she would have had a different child, to whom she would have given a better start in life. (Parfit 1987, 358)

Using this example, Parfit argues that such a child, born to a 14-year-old mother, is not harmed merely because a child born later would be in a better position, as these would be two different children. According to Parfit, the child born was not harmed because that child's only alternative was not to exist at all: "the girl's decision was *not* worse for *this* child" (1987, 358).¹⁰

Feinberg expands this point using a different thought experiment, whereby a couple conceive a child knowing there is a risk that it will have a genetic deformity. He argues that such a couple do not harm that child, because

to be harmed is to be put in a worse condition than one would otherwise be in (to be made "worse off"), but if the negligent act had not occurred . . . [the child] would not have existed at all. (Feinberg 1984, 102)

Nonetheless, according to Feinberg, such a child will have been *wronged* where its condition is "so severe as to render his life not worth living" (*ibid.*).¹¹

Parfit and Feinberg are claiming that to be harmed is to be made "worse off" relative to one's alternatives. According to this definition, a child's conception/birth cannot harm it unless that specific child could have been in an alternative less/non-harmed state. This, they argue, leads to the conclusion that (a) a 14-year-old girl cannot harm the specific child that she

¹⁰ Parfit goes on to argue that it can nonetheless be wrong for a child to be born to a 14-year-old girl: "it *would have been* better if she had waited and had a child later" (Parfit 1987, 360). See 4.2.2 for a discussion of this type of claim.

¹¹ He also argues that where a child has not been harmed or wronged, the mother's act can be wrong where it involves "wantonly introducing a certain evil into the world" (Feinberg 1984, 103). See below for a discussion of this type of claim.

gives birth to by merely giving birth to it, and (b) conceiving a child in the knowledge that it will have a genetic defect cannot harm that specific child.

This definition of harm does not, however, receive universal assent. Harris contests Feinberg's definition of harm, preferring to define harm as putting an individual into a position "in which that individual is disabled or suffering in some way or in which his interests or rights are frustrated" (Harris 1998a, 109).

For Harris, to be harmed is to be put in "a disabling or hurtful condition, even though that condition is only marginally disabling and *even though it is not possible for that particular individual to avoid the condition in question*" (ibid., my emphasis). Thus, Harris explicitly rejects the idea that being made "worse off" relative to one's alternatives is a necessary condition for being harmed.¹² This definition of harm renders it possible that a clone could have been harmed by its mere creation or birth where the clone is born disabled or suffering, despite not being denied any alternative.

Insofar as being put into a position in which one's "interests or rights are frustrated" constitutes harm, Harris' re-definition appears contradictory. For one's interests or rights to be capable of frustration it must be possible for one's interests or rights to be fulfilled (i.e., not frustrated), which presupposes the possibility of an alternative non/less-harmed position in which they are fulfilled. Thus, if Harris' rejection of Feinberg's definition is to be meaningful, he must be arguing that being made worse off is a sufficient, but not a necessary, condition for being harmed.

This means that Harris' definition of harm is wider than Feinberg's definition. However, both Harris and Feinberg purport to offer coherent definitions of harm. Since this book seeks to apply the *PGC*, I will address this conflict using this moral principle.

Under the *PGC*, a wrong can only be done to an individual where that individual's (actual or presumed) rights have been violated. Thus, under the *PGC*, for a wrong to be done to an individual who matters morally, that individual must have been made worse off relative to its alternatives.¹³ It follows that insofar as Harris' re-definition of harm does not presuppose an alternative less/non-harmed state, it cannot be used to show that any wrong has been done to the cloned child by its cloning.

It also follows that Feinberg's claim that a child can be wronged by its birth/conception if it has a life not worth living, is subject to the same requirement. So, a child can only be wronged in a sense relevant to the claim that we owe that child duties to prevent that wrong, if it has been made worse off relative to its alternatives. Moreover, the *PGC* does not permit us

¹² A similar position is presented by Green 2001, 120–121.

¹³ Since, in the abstract, the *PGC* grants rights to the generic features (i.e., the categorical needs) of agency, "worse off" is measured in terms of an agent's possession of the generic features.

to assume that another agent's life is not worth living. I (any agent) can decide that my life is not worth living—and release others from the burden of their obligations towards me—but no one else is entitled (without my consent) to decide for me that my life is not worth living.¹⁴

Thus, we need to ask whether it is possible for the cloned child to have been made worse off relative to its alternatives by the mere fact of its being cloned. This requires the cloned child to have been denied an alternative existence by the cloning process *and* that alternative to be better for it with regard to its possession of the generic features. Satisfying these two conditions will demonstrate that the child has suffered a *prima facie* harm. It would, however, still need to be established that others have failed to fulfil their duties to it by causing or failing to prevent this *prima facie* harm.

Can cloning deny that cloned individual (X) the opportunity of a better existence? A positive answer might be generated by combining a number of highly implausible metaphysical assumptions.¹⁵ The problem is that, without making more assumptions than can be justified, using the cloning process to create X appears to be a necessary condition for the existence of X. Thus, no matter how bad the clone's traits, prospects, or situation it does not appear that a wrong has been done to it by its mere cloning.

To be clear, I am arguing that the act of cloning *as such* cannot violate that clone's generic rights. It remains possible that the act of cloning might violate the rights of others, and the act of cloning might also be characterised by an immoral intention to violate the rights of the clone in the future.¹⁶ These possibilities are examined below.

We are now better placed to examine the two main types of arguments against cloning, i.e., the argument that cloning is wrong because of the future suffering that the clone is likely to endure and the claim that it is wrong because of the unpredictability and risks of the technology.

5.2.2 Cloning as Wrong because of the Likely Future Suffering of the Cloned Child

A common objection to cloning is that the cloned child will suffer harm. It has been argued, for example, that the clone will be harmed by the fearful or

¹⁴ Remember, that here I am only talking about duties to the cloned child; it remains possible that our duties to others (or the child's limited moral status) require us to treat the child's life as if it were not worth living. I am not addressing this point here.

¹⁵ Examples of possible scenarios whereby a cloned individual X would be in a worse position because of the cloning process seem to require assumptions such as dualism and the cloning process somehow foreclosing X's alternative corporal existence.

¹⁶ Since the *PGC* is only concerned with the suffering of unwilling generic harm by agents, it is also incompatible with the notion of a victimless wrong.

prejudicial attitudes of others, by the demands and expectations of parents or genotype donors, or by their own awareness of their origins.¹⁷ Ruth Deech, the head of the UK Human Fertilisation and Embryology Authority, has argued that it is "reasonable to fear that a cloned child's well-being might be threatened" (1999, 100). She asks rhetorically,

Would cloned children be the butt of jibes and/or be discriminated against? Would they become a sub-caste who would have to keep to each other? Would they be exploited? Would they become media objects? ... Would a cloned child be subject to excessive control from its parents or from one parent, who may already be too dominating as evidenced by the choice of the cloning technique? (ibid., 98).

Similarly, Ramsey claims that,

Growing up as a twin is difficult enough anyway; one's struggle for self-hood and identity must be against the very human being for whom no doubt there is also the greatest sympathy. Who then would want to be the son or daughter of his twin? To mix the parental and the twin relation might well be psychologically disastrous for the young. (1970, 71–72)

These objections depend on the defensibility of at least two premises: the empirical likelihood of such future harm occurring and the claim that it is impermissible to clone a child if it faces a risk of such future harm.

Many of the empirical presuppositions of such views are either implausible or lack evidential support. This is especially the case where it is argued that the clone will be psychologically damaged by its being a clone. Perhaps, a cloned child will suffer psychological harm—it might be traumatised by knowledge (or lack of knowledge) of its genetic origins, by the (mistaken) belief that it lacks a unique identity, or by feelings of inadequacy. But it might not. Perhaps, a cloned child will feel secure about its genetic origins (many children are adopted or have unidentified genetic fathers), will feel very unique (after all clones are likely to remain rare), and will have no unusual feelings of inadequacy (it might achieve more than its genotype donor ever did or accept that its parents wanted it so much they used such a controversial technology). These hypotheses are best tested using existing correlates, such as identical twins, adopted children, and children produced by donor insemination or a surrogate.

Even if, however, the pessimistic predictions prove to be defensible, it does not follow that cloning is impermissible. In many cases the feared harm is not the result of the child's condition as a cloned individual, but the

¹⁷ Such arguments are summarised in Burley and Harris 1999, 108; and Brock 1994, 155–158.

immoral conduct of others. This is the case where, for example, a cloned individual suffers harm because of the fearful or prejudicial attitudes of others, or because of the illegitimate demands and expectations of others.¹⁸ Prohibiting cloning on the ground that the cloned child will be (immorally) harmed is far from straightforward. In many ways the anticipated immoral conduct of others towards clones is analogous to predictions of prejudice towards mixed-race children. All things being equal, it is the predicted (future) immorality that ought to be addressed. Of course, all things might not be equal, because addressing the predicted future harm directly might require problematic constraint on prospective parents. As always, the application of the *PGC* must, insofar as possible, take account of the realities of the situation; no prospective parent will be perfect but many illegitimate prejudices and expectations can be addressed by education and counselling.

Arguments premised on the future suffering of the clone must be carefully formulated if they are to avoid claiming that a wrong was done to the clone by its creation. Such an argument was rejected above, on the basis that the cloned child cannot be assumed to have been deprived of a better alternative existence by the mere fact that it has been cloned and, therefore, it cannot be taken to have suffered *PGC*-relevant harm by being cloned.

If concerns in relation to the predicted future suffering of the clone are justified,¹⁹ cloning might, however, violate the *PGC* for other reasons. Two possibilities remain. First, if it can be shown that, as a result of this predicted future suffering, the motive or intention characterising the act of cloning involves the violation of the rights that the clone will have in the future, then the action of cloning will be immoral.²⁰ Second, permitting cloning irrespective of the future suffering of the clone might, in some circumstances, be a wrong to presumed agents other than the clone. I will address each possible line of argument in turn.

An extreme example of a situation where the first possible argument would be relevant would be where a person intended to create and raise a clone for the purpose of causing it future suffering. This involves an uncontroversial intention to violate the rights of the clone-in-the-future. However, cloning in general need not have any such an intention, and

¹⁸ Prejudices, defined as attitudes and behaviour that treat agency-irrelevant features as if they were relevant to the possession of moral status, clearly violate the generic rights of agents. Similarly, demands and expectations not derived from, or protected by, the *PGC* are immoral. Burley and Harris argue along similar, but non-*PGC* based, lines (see Burley and Harris 1999, 110 and 111).

¹⁹ It is, of course, possible to envisage situations where future suffering to the clone can be justifiably predicted. Where, e.g., the person(s) intending to rear the child are known child abusers.

²⁰ This is the futurity argument that was briefly discussed as an argument for indirect self-connected protection in 2.6.1, above.

knowledge that the clone might have a difficult childhood cannot be equated with an intention to violate the rights of the clone in the future. Although it is easy to envisage circumstances where the act of cloning would be characterised by an immoral intention that is likely to cause future suffering for the clone,²¹ such an intention is not necessarily connected to the act of cloning.

The second possible type of argument that uses the predicted suffering of the clone as a ground for claiming that cloning is immoral involves characterising cloning as a wrong to possible agents other than the clone or future clone. It might, for example, be argued that creating a clone with knowledge of the future suffering that it is likely to endure—if indeed it is likely to endure such future suffering—displays an undesirable tolerance towards the suffering of others on the part of the person performing or commissioning the creation of a clone. According to this argument, such indifference is likely to express itself in other situations leading to the violation of the generic rights of others. I am not aware of anyone presenting such an argument, so it is something of a straw man. In general, the argument that those who clone are likely to be indifferent to the suffering of possible agents other than the clone—which is an instance of the argument presented as “possibility two” in 2.6.2—requires highly implausible empirical support. Moreover, it is not enough that it is merely possible to use the technique in a manner incompatible with the *PGC*.²²

Another possible argument is that creating a clone who will suffer is likely to cause harm to others by negatively affecting their sensibilities. As I pointed out in 2.6.2, when addressing the use of such an argument to establish indirect moral status, protecting agents’ sensibilities is required by the *PGC* only as a means of protecting the generic features of agents, and only when these sensibilities are themselves consistent with the requirements of the *PGC*, including the requirement to treat all agent subgroups as agents. This is important, because where the sensibilities of others are affected by the immoral behaviour of some towards the clones, the belief that the clones lack intrinsic moral status, or misunderstandings of what clones are, they have little force as arguments against cloning. (There might, however, be *contingent* circumstances where the protection of other’s sensibilities would require the prohibition of cloning.)

An added complication is that cloning might, in some circumstances, maintain and enhance the generic features of agents other than the clone. For a small minority, cloning represents the only potential means of alleviating or

²¹ An intention to violate the rights of the cloned child in the future may be imputed from the evidence. In general, regulatory mechanisms must enable such imputations of intention; otherwise the epistemic gap would prevent regulatory responses to rights-violating conduct.

²² For further discussion of this point, see 7.1.

evading psychological harm resulting from involuntary childlessness based on an overwhelming desire to have a genetically related child (see 4.4). Thus, something more than a *prima facie* wrong is required to justify denying access to cloning technology (see below).

5.2.3 Cloning as Wrong because of Safety Concerns, such as Increased Risks of Abnormalities, Cancer or Shortened Lifespan

Another popular objection to permitting the cloning of human beings relies on the risks of this nascent technology. The UK Human Fertilisation and Embryology Authority (HFEA) and Human Genetic Advisory Commission (HGAC) produced a joint report on cloning stating,

Safety is itself an ethical issue. Nuclear replacement in animals is at present very inefficient . . . In humans, the waste of human eggs and the high risk of miscarriage and congenital malformation alone would exclude the possibility of reproductive cloning. (HFEA and HGAC 1998b, para. 4.4)

A year earlier the US National Bioethics Advisory Commission (NBAC) had reached a similar conclusion,

the use of this technique to create a child would be a premature experiment that exposes the developing child to unacceptable risks. This in itself is sufficient to justify a prohibition on attempts to clone human beings at this time. (1997, 87)

Also, the Canadian Tri-council report stated,

It is not ethically acceptable to undertake research that involves . . . cloning human beings by any means including somatic cell nuclear transfer [i.e., the Dolly technique]. (Medical Research Council of Canada *et al.* 1998, Article 9.5)²³

There are a number of “safety” concerns raised. First, as pointed out in 3.5, cloning technology is currently extremely unreliable and will result in many failed attempts. Although the success rate has improved since the creation of Dolly, it took 277 attempts to transfer a nucleus to the egg, out of which only 29 were suitable for implantation, and only one live birth resulted. Thus, unless the Dolly technique is dramatically improved, its application to human will require large-scale embryo research and destruction, risks of spontaneous miscarriage, and risks to the surrogate mother. Second, there

²³ More recently, Health Canada reiterated this position (see Health Canada 2001b, p.5).

are worries that cloning will result in a child with restricted future purposes, because it is, perhaps, at a higher risk of cancer or will have the age of the person from whom its nuclear material was derived. Moreover, the cloned child might actually lack the potential for ostensible agency.

These two safety concerns raise different issues. With regard to the first it should be noted that the success rate for use of the Dolly technique is actually better than what it was for the first IVF trials; in the experiments leading up to the creation of Dolly, since 29 reconstructed embryos were implanted into 13 ewes, the live birth rate was one in 13.²⁴ Moreover, the technique has already been improved (see Wakayama *et al.* 1998; Rideout *et al.* 2001). However, improvement has been very slow and even now only a few percent of re-nucleated eggs result in surviving offspring.²⁵ Also, the fertility of animals such as sheep is actually greater than human fertility.

Many of the issues raised by the low success rate of cloning are the same as those raised by the deliberate creation of embryos for research (see 4.5.1). If it is permissible to conduct embryo research as a means of addressing the generic harm potentially suffered by ostensible agents (by say involuntarily childlessness), then research into cloning for this purpose is *prima facie* permissible.

With regard to the second claim, the fear that the resultant child would have a genetic defect, it has been argued that

cloning is actually genetically safer than normal sexual reproduction because it bypasses the most common form of birth defect – having the wrong number of chromosomes. (Kolata 1997, 202)

Birth defects caused by recessive genes can also be largely avoided by cloning a healthy adult. At present, though, cloning has many unknown risks and consequences and so falls far short of this potential.

Once again we return to the rejected notion that a wrong is done to a clone by its mere cloning (5.2.1). It must be emphasised that this conclusion is not undermined by *any* damage to the clone that is unavoidable if *that specific child* is to exist. Where, however, safety concerns are likely to cause future suffering for the cloned child, this might be relevant to the rights of other agents (see, e.g., 5.2.2). More specifically, safety concerns are particularly relevant when considered with regard to the reality of limited resources and consequent resource allocation difficulties (see Chapter Seven). If faced with a choice between permitting access to cloning (which is currently unpredictable and might cause more distress to the prospective parents than it removes) and permitting access to a IVF (on which there is

²⁴ The live birth rate for IVF, where the gametes are fertilised outside the body, is under 20% per treatment cycle (see HFEA 2000, 11 and 14).

²⁵ A good summary of the current position can be found in Rideout *et al.* 2001.

over 20 years of experience), the latter is more likely to address relevant generic needs. As it currently stands, cloning is unlikely to reduce the suffering of the involuntary childless and might even increase it. Thus, in many cases the safety concerns currently attached to the majority of cloning techniques are sufficient to generate a presumption in favour of less problematic techniques, especially where the choice is between two or more claimants where only one can be offered access.

Thus, the safety concerns raised by cloning are not nearly as conclusive as they are often assumed to be. Insofar as they have force, they merely repeat objections to embryo research or indicate the futility of using cloning to influence traits before the technology is mastered.

5.3 Arguments in Favour of Cloning

Cloning is not without its supporters. I am not, here, concerned to analyse the reasons why people might wish to clone so much as the moral justifications capable of being offered for cloning.

The two main arguments in favour of cloning, considered below, are that cloning is justified as part of one's general right to liberty or as part of one's right to reproductive freedom, and that cloning is justified because it can replace socially important people, dead relatives, or provide important sources of material such as organs.

5.3.1 General Liberty and Reproductive Freedom Justifications

Since, under the *PGC*, anything that does not violate the rights of others is morally permissible, the starting assumption must be that any willed act or omission is morally permissible. This assumption is, however, easily rebutted by demonstrating that the rights of others are violated by the exercise of such reproductive choice.

The general liberty argument is often used in the context of scientific enquiry, often combined with the further assumption that freedom of scientific enquiry is an intrinsically worthwhile pursuit worthy of much greater protection. However, scientific enquiry *per se* does not necessarily carry any greater weight than any other liberty. Under the *PGC*, the only activities entitled to protection are those that are protective of the generic features of agents. Thus, some scientific enquiry is entitled to greater protection, but the general activity is worthy of no more protection than any other activity. In short, the pursuit of scientific knowledge is an instrumental good to be constrained where it is likely to harm others. Research into, say, cancer is more likely to be justifiable than the use of cloning to investigate the genetic contribution to homosexuality. Nonetheless, the mere possibility

that research into human cloning might make important advances in scientific knowledge possible is not enough to provide strong presumptive foundations in favour of cloning.

The right to make reproductive choices can, however, be given firmer foundations than reliance on the general liberty right. As I have already indicated, the inability to exercise one's reproductive choices, such as the choice to participate in the reproductive enterprise, can severely affect the generic features of those (ostensible) agents who happen to value the ability to exercise such choices (see 4.4). Thus, where cloning presents the only means for an involuntarily childless person to have a child,²⁶ a carrier of a mitochondrial disease to have a child without the disease,²⁷ or a person to avoid other undesired traits, and the denial of such an opportunity will cause generic harm to an ostensible agent, there is a *prima facie* presumption in favour of allowing cloning. This is a *prima facie* presumption because of the complexities raised by the fact that the use and development of cloning technology requires embryo research and the goal of prenatal influence to be a legitimate goal.²⁸ In general, however, cloning shares similar ground to assisted reproductive techniques such as IVF. Nonetheless, in some (and perhaps many) cases access to counselling might (all things considered) be a more appropriate way of addressing the distress caused by involuntary childlessness where other options are unlikely to be successful. Moreover, given the early stage of cloning technology, other assisted reproductive techniques would often be more appropriate subjects of this presumption.

The presumption in play here can, with qualifications, be expressed as a *prima facie* right to procreative autonomy. I point this out, because Ruth Deech, when rejecting John Harris' defence of a similar claim argued that "Harris's putative right to procreative autonomy cannot justify human cloning because this right would violate important provisions of the 1990 Act" (Deech 1999, 98). Taken out of context this claim appears to beg the question, as moral justification cannot be presumed to be constrained by the contingencies of the UK legislation. However, Deech argues that the provisions of the 1990 Act that (she believes) implicitly reject cloning as part

²⁶ Cloning will, e.g., enable women who have no ova, men who have no sperm, or those without a partner to produce offspring that are genetically/biologically related.

²⁷ Since Dolly's mitochondrial DNA came from the enucleated oocyte with which the udder cell merged (see Evans *et al.* 1999), using the enucleated egg of a woman without mitochondrial disease could enable a woman with such a condition to reproduce without passing it on to her offspring. There are more than fifty inherited metabolic diseases thought to be caused by mitochondrial DNA (see Department of Health 2000a, para. 22, 8).

²⁸ There is also the complexity of the predicted low success rate for human clone (suggested by the animal studies). This means that cloning is unlikely to satisfy the generic needs of the vast majority of the involuntary childless.

of a right to procreative autonomy, are morally defensible. She argues that there are two very important provisions of the UK legislation to consider,

The first of these is the rule governing the use and creation of embryos. Few would disagree that it is unacceptable to clone humans if doing so would involve (and it most certainly would) wastage of large numbers of embryos in the process. Second, the 1990 Act also requires that when assisted conception technology is used, due consideration must be given to the well-being of any resulting child. (Deech 1999, 97–98)

The position of the UK legislation with regard to cloning will be explored in detail below (5.4). However, a few points about Ruth Deech's interpretation of the Human Fertilisation and Embryology Act 1990 need to be considered. First, the UK legislation actually allows the creation of embryos for research, including research that is "necessary or desirable" for promoting advances in the treatment of infertility: Schedule 2, paragraph 3(2) (see 4.5.2 and Appendix 3). Thus, the rules governing the use and creation of embryos do not unequivocally rule out the use of embryos for research into cloning.²⁹ Further, even if they did, Deech gives no argument as to why this is a morally defensible position. Second, although the UK legislation does require consideration to be given to the welfare of any resulting child (s. 13(5)), I have already argued that cloning *per se* cannot violate the moral interests of the cloned child. Indeed, the specific argument used by Deech was rejected in above (5.2.2). Therefore, the presumption that I have defended above is not rebutted by these concerns.

5.3.2 Cloning Can Replace Socially Important People, Dead Relatives, or Provide Sources of Material

There are many purported justifications for cloning that rely on the purposes for which the clone could be used. Some of these demonstrate a misguided understanding of the technology. For example, for reasons given below, the claim that cloning could replace socially important people rests on implausible genetic determinism, correlating the replication of an individual's genome with the replication of that individual. This particular example needs careful consideration under the *PGC*, as social utility must be interpreted in terms of rights-fulfilment, and the creation of clone to replace a socially important individual suggests that the intention is to subject the clone to morally illegitimate social pressure to conform to the behaviour of a

²⁹ The purposes for which embryo research is permitted have, since Deech wrote, been extended even further (see 4.5.2). Also, the use of the Dolly technique since has been held to fall outside the scope of the UK legislation (see 5.4).

prior social figure. It would be illegitimate to attempt to force the clone to conform to such a pre-set pattern or standard when the clone has no duty to do such. Thus, cloning with such an intention will usually be characterised by an immoral intention, i.e., an intention to violate the rights of the clone-in-the-future. Nonetheless, due to complexities introduced by the fact that a certain degree of parental expectation and constraint appears to be unavoidable, the mere possibility that cloning could be performed for such a purpose is not sufficient to prohibit all attempts to clone (see 6.1).

Clones might also be created because of the benefit that the clone's body (or body parts) could have for others. The creation of a clone might be attempted to provide spare or replacement body parts, such as organs or tissue, for the original (see, e.g., Savulescu 1999; Harris 1998a, 128). Where, for example, a child is in desperate need of a kidney transplant and no compatible donor is available, the creation of a genetically identical clone would appear to be the perfect solution for that child. An organ from a genetically identical being would be histocompatible and, therefore, unlikely to be rejected or require the use of immunosuppressive drugs. If such a use is to be justified it must take into account the moral claims and status of the cloned being, and the alternatives available. If, for example, cloning technology could be combined with germ-line gene therapy to produce an anencephalic organ donor, the moral status of this clone would be very low; perhaps, sufficiently low to permit its destruction so that its organs could be used to save the life of an ostensible agent.³⁰

There are reported instances of children being conceived to act as donors for existing children, albeit not by cloning methods. For example, in late 2000, two families approached IVF clinics seeking to use PGD to obtain a donor for an older child who was critically ill with Fanconi's anaemia (see Hazlewood 2000). There was a precedent for this, as embryos had been created and genetically selected to help Molly Nash, an American girl also suffering from Fanconi's anaemia. Molly received (stem) cells from her brother's umbilical cord to help her fight the inherited bone marrow disorder, which causes bleeding, immune system problems, and leukaemia. After receiving the transplant from her brother, she was thought to have an 85 to 95 cent chance of being cured (see Orr 2000). Had she not received the transplant, she would probably have died within a year (see Ledward 2000).

Predictably Molly's situation was the source of some concern. However, all the evidence suggests that a child donor is not harmed by the removal of cells from its umbilical cord. Therefore, its creation for this purpose did not

³⁰ In the future, perhaps, some of the brain cells from an embryo could be removed after cell differentiation so that it can be grown into a brain-dead child (creating something like an anencephalic newborn).

display an intention to violate its rights in the future³¹ and (given that its only plausible alternative was not to exist) the resultant child has not been harmed by its selection or birth.³² If cloning technology were more likely to produce a compatible donor, it is difficult to see what would be wrong with creating a cloned child for this purpose.

In most cases, however, the required donation is far more invasive. For example, there have recently been reports of a family who seek to use PGD to select an embryo capable of developing into a suitable bone marrow donor to save the life of their son who suffers from the potentially fatal blood disorder beta thalassaemia (see Boseley 2001). Even more problematic are those cases involving solid organs. Here, other potentially less problematic alternatives to cloning need to be explored. The use of cloning to provide organ donors is appealing primarily because of the current shortage of spare organs for those in need, causing people to die who could be saved by a transplant. However, according to Harris,

Indeed it seems clear that the benefits from cadaver transplants are so great, and the reasons for objecting so transparently selfish or superstitious, that we should remove altogether the habit of seeking the consent of either the deceased or relatives. This we already do when post-mortem examinations are ordered without any consents being required and despite the fact that these too involve interference with the dignity of a dead body and the removal (albeit it) temporarily of organs. (1998a, 125)

As Harris recognises, UK practice does not follow this suggestion. The relevant legislation—the Human Tissue Act 1961—is far from unproblematic. S. 1(1) states that the removal of an organ for therapeutic, educational, or research purposes can be authorised by the “person lawfully in possession” of the body if the deceased “either in writing at any time or orally in the presence of two or more witnesses during his last illness” had previously consented to such removal. In the absence of such prior consent, s. 1(2) states that the “person lawfully in possession of the body” may authorise such removal if, after making “such reasonable enquiry as may be practicable,” that person has no reason to believe that the diseased had expressed an objection to organ removal or that “the surviving spouse or any

³¹ If such an intention was suggested by the circumstances, this would provide grounds for preventing the conception/creation of the child in the first place.

³² In line with these considerations, in a press announcement on 13 December 2001, the UK licensing authority announced that it will now allow tissue typing in conjunction with PGD to be used to select an embryo for the treatment of an existing sibling suffering from a serious genetic disease. The boundaries and application of this changed policy will be considered on a case-by-case basis. This press announcement can be found on the HFEA website: <http://www.hfea.gov.uk>.

surviving relative of the deceased objects to the body being so dealt with." There are a number of issues raised by the Act (see, e.g., Mason and McCall Smith 1999, 350).³³ Most strikingly, although the relatives cannot object to donation under s. 1(1), in practice, transplantation does not go ahead if an objection is made. However, the moral position is not quite as simple as the passage quoted from Harris suggests. Preventing people from opting out of posthumous donation threatens the deeply held values of some, including strongly held religious beliefs, and is likely to cause considerable distress to those who are worried about their organs being harvested before they are actually dead or before they become incapable of feeling pain. Some of these concerns are far from irrational. To take just one example, many anaesthetists have expressed considerable unease with the removal of organs from "brainstem dead" donors without anaesthetic, on the basis that there is a possibility that these people can still experience pain (see Boseley 2000).³⁴ These concerns can also apply to relatives who object to such donation. While many of these concerns can be simply dismissed as hierarchically less important than the basic harm threatened to those in need of a transplant, this will not always be the case. The positive right of those in need of a transplant must be weighed against the costs, in terms of predicted basic harm, on those who object, and the cost of ignoring such objections. Thus, although the *PGC* would support a presumption in favour of transplantation, this must be rebuttable to protect hierarchically greater *PGC*-protected values—which admittedly given the almost inevitability of death to those in need of the organ are not nearly as prevalent as commonly assumed.

To return to my main point, if cloning is to be justified as a means of providing suitable donor organs, the alternatives need to be explored and legitimately rejected, and one apparently less problematic alternative would be to operate an opt out system for organ donation where the opt out provisions were limited.³⁵ Of course, this alternative does not address the other major drawbacks of transplants: namely, cost (e.g., it costs about £100,000 or US\$160,000 to replace a heart) and the need for donor recipients to be given immunosuppressive drugs (see Gurdon and Colman 1999, 744). There are also other alternatives, such as the use of animal organs or the creation of suitable organs from genetically reprogrammed

³³ S. 1(8) states that "[n]othing in this section shall be construed as rendering unlawful any dealing with, or with any part of, the body of the deceased person which is lawful apart from this Act." Thus, non-compliance with the Act's main provision has no direct civil or criminal law consequences, rendering the Act little more than a statement of good practice.

³⁴ All things being equal, precautionary reasoning would require that all "brain stem" dead patients be given anaesthetic before their organs are removed.

³⁵ Although the UK legislation allows for some policy change, since the legislation has not been applied in this way, new legislation would be a much more defensible way of changing UK policy with regard to organ donation.

stem cells. These, however, are currently infeasible and raise other ethical issues.³⁶ Moreover, like cloning a donor, these are not alternatives for those whose medical need is urgent.

In summary, the use of cloning technology to produce donor tissue for existing persons is not unequivocally immoral. If it became scientifically feasible, its acceptability would depend on the donor's moral status, the invasiveness of tissue removal for the donor, the purpose for which the tissue is needed, and the alternative ways of obtaining that tissue.

5.4 Regulation of Cloning³⁷

The regulation of human cloning is patchy.³⁸ Where legislation does address cloning, it is often influenced by the previous scientific orthodoxy that cloning by nuclear substitution would be done by either replacing the nucleus of an embryo or replacing the nucleus of an egg with a nucleus from an embryonic cell. In other words, replacing the nucleus of an egg cell with a nucleus of a somatic cell taken from an adult (the "Dolly technique"), was not considered to be a possibility before the creation of Dolly the sheep. It follows that the application of the Dolly technique to human beings might evade legislative provisions that have been drafted too narrowly.

In addition to the licensing requirement imposed on the storage, use, or creation of an embryo outside the body, the UK Human Fertilisation and Embryology Act 1990 prohibits the granting of a licence for the nuclear substitution of an embryo.³⁹ This led the Human Genetic Advisory Commission (HGAC) and the Human Fertilisation and Embryology Authority (HFEA) to declare that, depending on the method used, cloning was either prohibited or subject to a licensing requirement.⁴⁰ However, since

³⁶ E.g., the use of animal organs, xenotransplantation, poses considerable risk of inter-species virus transfer.

³⁷ The full details of the law as summarised in this section can be found in Appendix 4.

³⁸ I am, of course, defining a clone as above. Thus, unless otherwise specified, when I claim that certain countries prohibit cloning, I am claiming that they prohibit the production of a child using cloning techniques—i.e., those involving the deliberate creation of a human being that is genetically identical to another human being or has the same nuclear gene set as another human being.

³⁹ S. 3(3)(d).

⁴⁰ This view was first expressed in their jointly written consultation document (see HGAC and HFEA 1998a, para. 2, 10). In the final report they declared that they have taken Counsel's advice,

As a result, both Ministers and the Authority . . . are content that the Act does allow the HFEA to regulate nuclear replacement into an unfertilised egg through its licensing system. (1998b, para. 3.4)

the Act defined an embryo as "a live human embryo where fertilisation is complete," including "an egg in the process of fertilisation," it was questionable whether this definition was sufficient to encompass the Dolly technique. After all, as Dr. Wilmut and Professor Bulfield put it,

The oocyte is an egg but it has not been fertilised and it never is fertilised because the nucleus is transferred to it. (Quoted in Science and Technology Committee 1997, xii.)

Although the English courts have historically tended to construe statutes literally or narrowly,⁴¹ they now tend to adopt a purposive or broad construction.⁴² Thus, I (with a co-author) ventured the view that the legal situation was uncertain, but

in practice, it is very likely that the term "fertilisation" will be judicially construed to include the nuclear substitution of an egg, especially since the HFEA seems to be acting according to this construction of the term. (Beylveled and Pattinson 2000b, 233)

If the relevant section did encompass the Dolly technique, since the HFEA had declared that it would not "license any research which has reproductive cloning as its aim" (HGAC and HFEA 1998a, para. 5.4, 11),⁴³ it would not be legal to create a cloned child from a somatic cell in the UK. However, in November 2001, Mr Justice Crane ruled that the Dolly technique was not covered by the Act.⁴⁴

This was also the view of the Chief Medical Officer's Expert Group (see Department of Health 2000a, para. 5.10, 47).

⁴¹ See, e.g., *Fisher v Bell* [1961] 1 QB 394, where it was held that the display of a flick knife in a shop window was not an "offer for sale" under s. 1(1) of the Restriction of Offensive Weapons Act, 1959, as the term "offer" was to be construed narrowly according to the law of contract.

⁴² Many examples could be given, e.g., see *Smith v Hughes* [1960] 1 WLR 830 and *Davis v Johnson* [1979] AC 264. In *Smith*, a statutory provision rendering it an offence "to loiter or solicit in a street or public place for the purpose of prostitution" was held to apply to prostitutes who solicited passers-by from inside a private building overlooking a street in London. In *Davis*, the House of Lords construed a statute enabling the court to exclude a person from the "matrimonial home," defined as extending to "a man and woman who are living together," to protect an unmarried woman who was no longer living with her violent cohabitant.

⁴³ See also HGAC and HFEA 1998b, paras. 3.8, and 9.2.

⁴⁴ *R (on application of Quintavalle) v Secretary of State for Health* [2001] EWHC 918, [2001] 4 All 1013. Although conceding that the argument for a purposive interpretation of section 1 was "a powerful one," Crane J held that to interpret s. 1 so as to encompass embryos created by the Dolly technique would require "an impermissible rewriting and extension of the definition" of an embryo (*ibid.*, 1024).

A Bill was introduced into Parliament just over a week later.⁴⁵ S. 1(1) of the resulting Human Reproductive Cloning Act declares,

A person who places in a woman a human embryo which has been created otherwise than by fertilisation is guilty of an offence.⁴⁶

This blanket prohibition is hard to defend on grounds other than political convenience. As the Human Fertilisation and Embryology Act shows, legislative prohibitions can quickly become dated. As the science develops, the technology is likely to become increasingly predictable and the public less fearful of its application to human beings. A suitably appointed regulatory body would be well placed to act on such developments, whereas an unspecialised legislative chamber is likely to be slow to amend such a legislative prohibition. Add these concerns to the conclusions defended above and this new provision is difficult to justify.⁴⁷ A better approach would have been to modify the definition of an embryo under the 1990 Act so that it covered any human embryo or equivalent capable of implantation. This would cover *possible* future developments (such as, perhaps, parthenogenesis⁴⁸ or ectogenesis⁴⁹) and enable defensible applications of cloning, as a new assisted reproductive technique, to be permitted in the future.

A situation similar to that under the UK legislation of 1990 exists under the Swedish Law No. 115 of 14 March 1991, which only regulates experiments performed on a *fertilised* ovum or gamete before *fertilisation*.⁵⁰ This has led the National Council of Medical Ethics and the National Board of Gene Technology to suggest that cloning using the Dolly technique might not be covered by the Swedish legislation. It also appears that research into cloning by embryo splitting is permitted up to 14 days after fertilisation,

This decision has been appealed to the Court of Appeal, so it might have been reversed (or upheld) by the time that this book is published.

⁴⁵ The Government had anticipated passing such an Act, even if cloning was covered by the 1990 Act (see Department of Health 2000b).

⁴⁶ Given its drafting, the Act does not regulate the creation of an embryo by nuclear transplantation where the embryo is not implanted. Thus, reconstructed embryos failing outside of the 1990 Act can be subjected to unrestricted research. By the time this book goes to press, this regulatory gap could well have been closed.

⁴⁷ Note that further considerations of relevance to cloning are explored in later chapters. Consequently, these conclusions are refined in Chapter 7 onwards.

⁴⁸ Parthenogenesis involves stimulation of an unfertilised human egg causing it to divide and develop into a child (this, female, child would be genetically identical to the producer of the egg). Although no human child has ever been produced (naturally or artificially) by parthenogenesis, it is a theoretical future possibility.

⁴⁹ Ectogenesis involves gestation in an artificial womb. This is currently infeasible.

⁵⁰ Ss. 2 and 4. Further details and references can be found in Appendix 4.

because such experiments escape the prohibition (in s. 2 of Law No. 115) on experiments that have the purpose of developing methods for achieving potentially hereditary genetic effects.

The German Embryo Protection Act 1990 was clearly intended to prohibit cloning. S. 6 of this Act renders it an offence to create an embryo that is genetically identical to another embryo, fetus, or any living or dead person. Many believe that this provision is sufficient to prohibit cloning by any method (see, e.g. Winter 1997). However, since the Act does not define the term "genetically identical,"⁵¹ it is questionable whether it is wide enough to encompass a clone produced using the Dolly technique, whose mitochondrial DNA will not be identical to that of the nuclear DNA donor.⁵² Even if it is not, given that the clear intention of this provision was to prohibit cloning by any method, and the fact that this act invokes penal sanctions for activities such as conducting embryo research, it would be extremely unwise to attempt to clone a human being in Germany.

One would expect the French legislation to be subject to the same problems, especially since cloning is not explicitly mentioned (see Appendix 4). Nonetheless, the consensus is that human cloning is implicitly prohibited in France. This conclusion is supported by the Parliamentary preliminary works⁵³ and re-asserted in opinion No. 54 of the National Consultative Ethics Committee (CCNE 1997). Nonetheless, the Committee was divided on whether more explicit wording would be worth adding when the legislation is revised. A later opinion, No. 60 of 25 June 1998, recommended (by majority) making the prohibition more explicit (see CCNE 1998). In its Opinion No. 67 of 18 January 2001, the CCNE again recommended explicit prohibition of reproductive cloning—this time unanimously (see CCNE 2001).

Similarly, in Denmark cloning by any method is expressly prohibited. Under the Danish legislation, assisted fertilisation must aim to unite a genetically unmodified egg with a genetically unmodified sperm cell, the implantation of genetically identical (fertilised or unfertilised) eggs is prohibited, and experiments intended to produce genetically identical individuals are prohibited.⁵⁴ Unusually these provisions appear to catch all forms of cloning.⁵⁵

⁵¹ As translated in Winter 1991, 191. This phrase is translated as "with the same genetic information" in the Bulletin of Medical Ethics 1990, 10; and as "having the same genetic information" in European Parliament 2001b,

⁵² Unless the recipient denucleated egg is from the same maternal line as the nuclear donor.

⁵³ Information provided by Pierre Langeron.

⁵⁴ Ss. 2, 4, and 28 of Law No. 460 of 1997.

⁵⁵ Also, in Finland although cloning as such is not prohibited, all research conducted for the purpose of facilitating the cloning of a human being is prohibited: s. 26, Medical Research Act No. 488 of 1999.

Similarly, the Spanish legislation renders it an offence to create human beings by cloning.⁵⁶ Interestingly, this legislation also renders it an offence to create identical human beings where it is aimed at race selection. This suggests that the Spanish parliament also objected to cloning on the grounds that it can be used to express racism. This issue is explored in Chapter Six.

Italy, a country renowned for political problems enacting legislation regulating genetic and reproductive technologies, has managed to regulate cloning by a form of secondary legislation. A Ministerial Decree, issued on 5 March 1997, prohibited all forms of experimentation and intervention aimed at (even indirectly) cloning a human. This decree was initially allowed to lapse after the 90 day period for which such decrees have force, but has now been renewed.⁵⁷

In general, where legislation exists it has attempted to prohibit cloning. Even those countries without legislative provisions addressing cloning—such as in Belgium, Canada, Greece, Ireland, the Netherlands, Luxembourg, and the US⁵⁸—often have regulatory mechanisms pointing towards prohibition (see Appendix 4). In Canada, for example, there has been a voluntary moratorium on the cloning of human embryos since July 1995, although the effectiveness of this moratorium is questionable (see Caulfield *et al.* 1997, 8). Also, in Portugal, there are constitutional provisions in the Fourth Revision of 1997 that might affect the legality of cloning (see 6.3.2, below).

All countries without legislation are, however, currently considering legislation that will prohibit cloning (see Appendix 4).

It is possible that cloning by any method will soon become illegal in just about all the countries under study, because of the pressure for a global legal ban on the development and use of this technique on human beings. In fact, ten of the fifteen EU countries have now signed the European Convention on Human Rights and Biomedicine and its additional protocol on the prohibition of cloning human beings.⁵⁹ Canada and the US are not member countries of the Council of Europe but were granted observer status during the

⁵⁶ S. 20, Law 35 of November 1998.

⁵⁷ Information provided by Roberto Mordacci.

⁵⁸ The Food and Drug Administration (FDA) claims regulatory jurisdiction over human cloning and has indicated that it will not permit the creation of a cloned child because of "unsolved safety questions...at this time" (FDA 2001). Recently, the House of Representatives passed the Human Cloning Prohibition Bill, which if passed by the Senate will prohibit the cloning of human beings for any purpose. There is also some state legislation (see NBAC 1997, ch. 5, table 1, 104).

⁵⁹ The Convention opened for signature on the 4.4.97 and its additional protocol opened for signature on 12.1.98. The ten EU signatories are Denmark, Finland, France, Greece, Italy, Luxembourg, the Netherlands, Portugal, Spain, and Sweden. Four of these countries have now also ratified the Convention (i.e., Denmark, Greece, Portugal, and Spain). Of these four, all but Denmark have also ratified the Additional Protocol.

negotiation of the Convention, so they can also sign it if they so wish.⁶⁰ Article 1(1) of this protocol makes what was implicit in the Convention⁶¹ explicit, by stating,

Any intervention seeking to create a human being genetically identical to another human being, whether living or dead, is prohibited.

Since "genetically identical" is defined, under Article 1(2), as "sharing with another the same nuclear gene set," use of the Dolly technique on humans is included within this prohibition.

The term "human being" is also not defined in the Convention, so the Netherlands, when it signed the Convention and its protocol, added an interpretative statement.

In relation to Article 1 of the Protocol, the Government of the Kingdom of the Netherlands declares that it interprets the term "human beings" as referring exclusively to a human individual, i.e. a human being who has been born.⁶²

This statement aims to make room for cloning experiments on embryos within the first fourteen days after fertilisation. Despite this, however, the legislation recently proposed by the Dutch government seeks to prohibit cloning and its necessary research.

There are a number of other international instruments banning human cloning. For example, Article 11 of the Universal Declaration of the Human Genome and Human Rights states,

Practices which are contrary to human dignity, such as reproductive cloning of human beings shall not be permitted.

The General Conference unanimously adopted this Declaration on 11 November 1997 (see UNESCO 1998).

The European Union (EU) has also taken some steps in this regard. The Directive on the Legal Protection of Biotechnological Inventions, for

example, states that "processes for cloning human beings" are unpatentable.⁶³ This is very likely to act as a disincentive for commercial research and investment into cloning. It might be argued that the disincentive is minimal, because the results of any investment can be protected by other intellectual property mechanisms, such as trade secrets. However, patent protection has particular appeal to commercial organisations and the condemnatory nature of the political will behind the Directive is itself a disincentive.

Although the EU has no general competence in this area, it has expressed reservations about cloning.⁶⁴ The European Parliament, for example, has passed numerous resolutions in support of a prohibition on the cloning of human beings, including the Resolution on the Cloning of the Human Embryo of 28 October 1993, the Resolution on Cloning Animals and Human Beings of 12 March 1997, the Resolution on Human Cloning of 15 January 1998, and the Resolution on Human Cloning of 7 September 2000. Similarly, the European Commission has declared that it opposes cloning and will not subsidise experiments. Cloning is also mentioned in some non-legal text, such as the Charter of Fundamental Rights of the European Union, Article 3(2) of which states,

In the fields of medicine and biology, the following must be respected in particular: ... the prohibition of the reproductive cloning of human beings.

Since it is not clear that cloning *per se* violates the PGC, restrictive regulatory approaches to cloning are in need of reconsideration. Although it is questionable whether much of the existing legislation covers the Dolly technique, all those countries with legislation have attempted to prohibit cloning. This dominant prohibitive stance stands in need of justification.

This is not to deny that some prohibitions might be necessary to prevent abuses. Prohibitions might, for example, be necessary to prevent the Dolly technique being used to clone living persons without their consent. However, not all use amounts to abuse.

5.5 Prenatal Gene Therapy

There are two potential forms of prenatal gene therapy. The first, *somatic (or somatic cell) gene therapy*, involves the genetic modification of somatic (body) cells only. The second, *germ-line gene therapy*, involves the genetic modification of germ cells (sperm or eggs), their precursors, or the cells of

⁶⁰ Article 33(1). For a discussion of the possible reasons why Canada has not signed the Convention, despite being directly involved in its framing, see Molinari 1998.

⁶¹ Provisions capable of being read as implicitly prohibiting cloning include Article 1, which requires parties to the Convention to "protect the dignity and identity of all human beings," and Article 18, which states that the creation of human embryos for research purposes is prohibited.

These provisions are important, because it is possible to sign the Convention without signing the protocol. Should a country, such as the UK, which has pre-existing laws on cloning, not wish to prohibit cloning it can make a reservation to these provisions of the Convention by invoking Article 36.

⁶² See <http://conventions.coe.int/Treaty/EN/cadreprincipal.htm>.

⁶³ Article 6(2)(a), Directive 98/44/EC.

⁶⁴ Cloning has also been condemned by the former European Group on Ethics in Science and New Technologies (see EGE 1997, para. 2.6-2.10).

early embryos where the germ-line has yet to be segregated. In practice, most gene therapy has the potential to affect both somatic and germ cells (especially where it is carried out on the embryo), therefore, in some cases, attempted somatic gene therapy might unintentionally alter the germ-line.

Only changes affecting the germ-line can be passed on to future generations. It is, however, possible to envisage a situation where a genetically altered somatic cell is subjected to the Dolly technique, thereby producing a child using the nuclear material of a somatic cell. In this case, what was a somatic nucleus is, in effect, re-programmed to become germ-line nuclei. To avoid this complexity, I use the phrase "somatic gene therapy" to refer to a situation where only somatic cells are genetically altered (ignoring the possibility of these cells being subjected to nuclear transfer, resulting in a genetically modified child).

Somatic therapy is not, however, the focus of the next sections. Before proceeding we need to address a background terminological dispute. Many claim that it is a misnomer to denote germ-line manipulations as "therapy" as there are no affected individuals to be treated (see, e.g., Glannon 1998, 195; Baird 1994, 571). This claim presupposes that neither germ cells nor the early embryo constitute *relevant* individuals. Against this, it was argued in Chapter Two that precautionary reasoning requires us to countenance the possibility that such entities could be relevant individuals, i.e., agents. Baird and Glannon also claim that the term "therapy" suggests the treatment of an existing condition rather than the prevention of such a condition. However, there is no reason why preventative strategies cannot be encompassed by the term "therapy," as long as what is encompassed by the definition is clear. Thus, I will continue to use the phrases germ-line gene therapy and germ-line modification as synonyms.

The next sections will explore the arguments made for and against deliberate germ-line gene therapy. The discussion is restricted to *deliberate* germ-line gene modifications to avoid the complexities raised by unintentional alterations of the germ-line that can flow from chemotherapy, radiation therapy, and other mutagenic contaminants. These additional complexities are beyond the scope of this book and the laws examined below. Despite the focus on the germ-line modifications, the conclusions reached have implications for prenatal somatic therapy (especially since such therapy is likely to lead to unintended germ-line effects).

Also, as with the arguments made in relation to cloning, where they typically address the goal of prenatal influence, rather than this specific technique, they will be addressed in Chapter Six. Thus, arguments that are often presented using slippery slope metaphors will be left for the next chapter.

5.6 Arguments Against Germ-line Gene Therapy

At present, *deliberate* germ-line gene therapy has not been successfully performed on human beings. It has, however, been performed on animals for over a decade. For example, transgenic mice—mice whose germ-line has been deliberately genetically modified—have been created since the mid-eighties. Genetically modified, or transgenic, humans are a possible extension of this. Although this is still far from being a reality (see, e.g., Danks 1994, 151), the first transgenic primate has been created (see Chan *et al.* 2001).

In the view of many advisory bodies, germ-line gene therapy is simply morally unacceptable. For example, according to a recent Tri-council Report in Canada,

Gene alteration (including "gene therapy") that involves human germline cells or human embryos is not ethically acceptable. Gene alternation for therapeutic purposes and involving human somatic cells may be considered for approval. (Medical Research Council of Canada *et al.* 1998, Article 8.5)⁶⁵

Many of the standard arguments against germ-line gene therapy are easily rebutted as either implausible or insufficiently specified. Arguments rejecting germ-line modification as "playing God" or interfering with nature usually either illicitly attempt to derive normative conclusions from non-normative premises or fail to explain how the normative premise is justified. Moreover, these arguments almost universally fail to provide an adequate explanation as to how we can distinguish the permissible natural from the impermissible non-natural, or how we are to know what God's will actually is.

Also, like cloning, germ-line gene therapy attracts rather *ad hoc* arguments against its development and use. There are, for example, those who argue that this technique violates the integrity of genetic patrimony, the right to inherit an unmodified genetic endowment, or the right not to be intentionally modified (see, e.g., Mauron and Thevoz 1991; Juengst 1991, 590). Such conclusions are certainly not uncontroversial under the *PGC*, because it might be the case that prenatal gene therapy could, in some circumstances, be necessary to maintain or advance the generic features of agents. Insofar as these *ad hoc* arguments have force it is because they carry other arguments in their wake. What is really an issue is not a right to be unmodified but the moral issues arising from the subjection of a prenatal human to a risky procedure. Thus, I will concentrate on the two more specific arguments arising out of this concern.

⁶⁵ More recently, see Health Canada 2001b, 5.

5.6.1 Germ-line Gene Therapy Has Too Many Scientific Risks and Uncertain Consequences

The first is the most prevalent argument against germ-line modification and, indeed, all the experimental techniques of prenatal influence. This points to the fact that the scientific risks and consequences are uncertain. Indeed, the UK Clothier Committee when reviewing gene therapy took the view that it should be confined to somatic cells, because of this risk and uncertainty (see Department of Health 1992).

The empirical evidence does suggest that genetic manipulation carries present and future risks for the subjects, i.e., for the entity that is manipulated and its future offspring. The technique itself involves risks to the manipulated subject, in that it could cause its destruction. Moreover, the future risks and effectiveness of the technique are an issue. For example, it has been pointed out that,

From animal models, we know that transgenic mice can have multiple gene insertions, higher mutation rates, and greater propensity to cancer than their normally generated counterparts. (Lappé 1991, 626, citing Orian *et al.* 1990, 393–397)⁶⁶

Other possible consequences of germ-line gene therapy raise concern. It has, for example, been argued that the use of this technique to modify, remove, or counteract an apparently deleterious gene could inadvertently remove any positive effects of that gene (see, e.g., Suzuki and Knudtson 1989, 202; Coghlan 1994, 15). The classic example cited is the gene associated with sickle cell disease. Two copies of this recessive gene result in sickle cell disease, but a single copy provides a degree of resistance to malaria. For at least two reasons this argument is much weaker than it appears. First, apparently deleterious genes with positive effects are extremely rare and so there is a relatively low probability of this consequence occurring. Indeed, the undiscovered effects of any gene might also be deleterious. Second, any positive effects, and the probability that germ-line gene therapy will remove them, must be weighed against the negative effects of the gene to be modified and the probability of these being removed. In the case of malaria, for example, the positive effects of the sickle cell gene can be replicated by vaccination and are only relevant to those who face an environmental risk of getting malaria. Also, those who are forced to suffer sickle cell disease suffer greater risk of harm to their generic features than is avoided by possession of this limited genetic resistance to malaria.

A similar response is to be given to arguments emphasising the allegedly deleterious effects on the human gene pool that might result from germ-line

gene therapy. First, it is unlikely that germ-line gene therapy alone could successfully eliminate any allele from the human gene pool and, even if this were not so, this would not be a problem unless we have a duty to maintain these genes in the gene pool. Any such duty is unlikely to be derivable from the *PGC*, as to use humans as maintainers of genetic diversity, when this diversity has a negative effect on them, is *prima facie* a violation of their generic rights.

What the current uncertainty and risks of germ-line gene therapy do mean, however, is that the technique is often likely to cause more harm than it cures. Nonetheless, it is possible to envisage circumstances where germ-line gene therapy, even with its current unpredictability might be justifiably used under the *PGC*. If, for example, it is used in an attempt to remove traits associated with non-viability and extremely low moral status (e.g., anencephaly), since the subject has so much to gain and apparently no alternatives, germ-line gene therapy is unlikely to violate our duties to the subject. Nonetheless, it should be kept in mind that it is impermissible to put possible agents at risk of generic harm where this is not likely to prevent greater generic harm to a possible agent. Thus, in general, prenatal gene therapy raises the same issues as other experimental and potentially therapeutic prenatal manipulation.

5.6.2 Germ-line Gene Therapy Involves Unconsenting Subjects

The second argument rejects germ-line gene therapy (and by implication all prenatal gene therapy) because it involves research and manipulation of early human embryos and their future offspring without their consent (see, e.g., Juengst 1991, 590; Moseley 1991, 642). Clearly, even when operating under the precautionary assumption that the subject is an agent, it can never consent to prenatal gene therapy. Nonetheless, the *PGC* does not impose an absolute duty of non-interference towards those unable to consent, as our duties of protection to possible agents can be overridden by other moral considerations, and intervention *legitimately* aimed at maintaining or advancing the subject's display of the generic features fully complies with our duties to it.

Therefore, more specific arguments are needed to show that germ-line gene therapy violates our duties to the non-consenting subject. One popular argument points to negative psychological effects on the future child that might follow from germ-line gene therapy. It has been argued, for example, that they might "suffer . . . an 'identity crisis,' concerned with who she is, where she's coming from, and where she is going" (Chadwick 1992, 126). This prediction is far from incontrovertible. Many children do not know their true genetic origins, and not just those who are adopted or resulted from assisted reproduction. Various studies indicate that as many as one in ten

⁶⁶ See also Berger and Gert 1991, 678; and Silver 1998, 270–273.

children do not have the genetic father that they think they have. Also, in many ways the children previously subject to germ-line gene therapy will know more about their origins than other children will. Empirical predictions of this sort cannot be assumed to be sound without supportive empirical research. Moreover, even if such predictions are defensible this predicted harm needs to be weighed against the predicted benefits of the intervention.

In general, if germ-line gene therapy were sufficiently safe and efficient at advancing the generic needs of the subject, it would be as justifiable as other, more standard, therapeutic interventions on a subject incapable of consenting.

5.7 Arguments in Favour of Germ-line Gene Therapy

When germ-line gene therapy becomes feasible, it might be the most effective, or in some cases the only effective, way of addressing certain deleterious genetic traits. Moreover, according to Zimmerman,

Germ-line therapy is more efficient than the repeated use of somatic cell therapy in successive generations Why subject each generation to having to undergo major, invasive intervention, when elimination of the culprit genes from the germ-line is possible? (1991, 597–598, original emphasis)

Zimmerman's ostensibly rhetorical question is, however, not as easily answered as it first appears. A number of possible reasons might be offered for restricting certain genetic manipulations to somatic cells. If, for example, a specific genetic modification was likely to mutate in future generations, repeated somatic gene therapy might be more efficient than germ-line intervention. Nonetheless, the general point is that if it is permissible to conduct prenatal somatic gene therapy it will generally be permissible to conduct germ-line gene therapy. I agree, simply because the types of considerations justifying the former intervention on a prenatal entity will just about always justify the same intervention in future generations. If prenatal gene therapy were to present a reliable means of advancing the generic features of offspring, all things being equal, it could be justifiably used on both present and future prenatal entities.

There are many other arguments capable of being raised in favour of germ-line gene therapy, including those based on respect for parental autonomy considered in relation to cloning (5.2.1). Nonetheless, parental desires to influence traits prenatally will rarely require the use of prenatal gene therapy. This is simply because, except in very rare circumstances where all the potential children of a couple have a high genetic risk of being

afflicted with an undesired genetic disorder,⁶⁷ PGD (which is actually a prerequisite for germ-line gene therapy) is a more practical means of prenatal influence. Not least because prenatal gene therapy is currently untested and unpredictable. Nevertheless, were it to become a realistic option, rejecting an embryo following PGD would be harder to justify.

5.8 Regulation of Prenatal Gene Therapy

In general, research into somatic gene therapy is less stringently regulated than germ-line intervention, often without prenatal somatic gene therapy being distinguished from its postnatal counterpart. Moreover, even in those countries without legislation, somatic gene therapy is looked on more favourably than germ-line gene therapy. In Italy, for example, the National Bioethics Committee (CNB) has published a document accepting somatic gene therapy while condemning germ-line interventions.⁶⁸

In the UK clinical trials of gene therapy products must be authorised by the Medicines Control Agency, which must be satisfied that the research is of sufficient safety, efficacy, and quality.⁶⁹ Also, in practice, any gene therapy protocol must be approved by the Gene Therapy Advisory Commission (GTAC)⁷⁰ and an appropriate research ethics committee.⁷¹ GTAC and the research ethics committees are, however, non-statutory bodies and, therefore, lack statutory powers to investigate or enforce compliance with their rules.

GTAC has issued guidance advising the restriction of research into gene therapy to

- (a) disorders that are "life-threatening or cause serious handicap" and for which treatment is either unavailable or unsatisfactory;⁷² and
- (b) limited to somatic cells.⁷³

⁶⁷ E.g., where both parents are homozygous for an undesired gene (have two copies of the relevant allele) or where the mother's mitochondrial DNA is defective.

⁶⁸ Information provided by Roberto Mordacci. The proposed legislation does not directly address germ-line gene therapy.

⁶⁹ The Medicines Act 1968 (as amended) regulates the handling and preparation of medicinal products and applications for their use in clinical trials. Products for gene therapy trials appear to fall within the scope of the Act. The factors stated in the text are specified in s. 19 of the Act.

⁷⁰ GTAC was set up in 1992 following the report of the Committee on the Ethics of Gene Therapy (the Clothier Committee): Department of Health 1992.

⁷¹ Before research on humans can be carried out in the NHS the research protocol must be approved by an appropriate local or regional ethics committee, i.e., a local research ethics committee (LREC) or multi-centre research ethics committee (MREC).

⁷² See GTAC 1994, para. 6. The Clothier Committee had previously recommended this.

⁷³ See GTAC 1994, para. 8.9.

Further, in its 1998 report on prenatal gene therapy, GTAC stated that

the use of direct, or vector, mediated gene therapy *in utero* are unlikely to be acceptable for the foreseeable future, in view of the safety and ethical difficulties. (GTAC 1998, para. 27(e))

Thus, all forms of prenatal gene therapy are prohibited by non-legislative mechanisms in the UK, the legal force of which is necessary indirect.⁷⁴

In the UK, as in many other countries, germ-line gene therapy also receives more direct regulatory oversight, as shown in Appendix 5. In fact, in the countries under study, where germ-line gene therapy is addressed by legislation it is either prohibited or heavily restricted.

The Austrian, Danish, French,⁷⁵ German, and Swedish legislation expressly prohibit germ therapy (see Appendix 5). The Swedish legislation seeks such a prohibitive stance by declaring that experiments on *fertilised ova* for the purposes of research or treatment "may not have the purpose of developing methods for achieving potentially hereditary genetic effects."⁷⁶ Thus, the Swedish legislation does not appear to prohibit germ-line modification and its associated research on *unfertilised* gamete cells.

Even the generally permissive UK Act prohibits germ-line gene therapy by declaring that a treatment licence cannot "authorise altering the genetic structure of any cell while it forms part of an embryo."⁷⁷ Nonetheless, the UK legislation does permit its associated research if it is specifically allowed by regulation.⁷⁸ No such regulation currently exists.⁷⁹

⁷³ See GTAC 1994, para. 8.9.

⁷⁴ Non-compliance with the rules or recommendations of GTAC (and the research ethics committees) does not, by itself, give rise to legal liability. It might, however, be relevant to related legal actions, such as claims in the tort of negligence for harm caused by the use of gene therapy. Moreover, when it comes to publishing the results of such research, many refereed journals require compliance with ethical scrutiny procedures.

⁷⁵ The French legislation states,

Without prejudice to research for the prevention and treatment of genetic diseases, no modification can be made to genetic traits with the purpose of modifying the descendants of a person. (Translated in CCNE 1997)

Thus, by implication, research into germ-line gene therapy is permitted. See, however, the restrictive regulation of *in vitro* embryo research in France (Appendix 3).

⁷⁶ S. 2, Law 115 of 1991.

⁷⁷ Schedule 2, para. 1(4) of the Human Fertilisation and Embryology Act 1990.

⁷⁸ Schedule 2, para. 3(4).

⁷⁹ Although the UK Act appears to leave germ-line modification of gametes unregulated, as stated earlier, gene therapy research is also regulated by the Medicines Control Agency (MCA), GTAC, and LRECs. However, as stated above, GTAC and the LRECs lack statutory powers to investigate or enforce compliance with their rules.

Slightly different approaches are adopted by the Spanish and Finnish legislation. The Spanish legislation prohibits embryo research where the "non-pathological genetic patrimony" is modified.⁸⁰ The Finnish legislation prohibits research on embryos or gametes for the purpose of developing methods to alter hereditary characteristics, *unless* it aims to find a cure for, or prevent, a serious hereditary disease.⁸¹ Thus, research into germ-line gene therapy appears to be permitted in specified circumstances.

Germ-line gene therapy might be permitted by default in some countries that have no specific legislation. Such countries include Belgium, Greece,⁸² and Italy. Not all countries without legislation take a permissive approach to germ-line gene therapy. For example, in Canada the voluntary moratorium that has prohibited cloning since July 1995 also prohibits germ-line gene therapy. The effectiveness of this moratorium has, however, been questioned (see Caulfield *et al.* 1997, 8).

Moreover, all those countries currently without legislation are in the process of considering legislation, with the possible exception of the US (see Appendix 5).⁸³

The European Convention on Human Rights and Biomedicine might have an effect on those countries without legislation, because Article 13 states,

An intervention seeking to modify the human genome may only be undertaken for preventive, diagnostic or therapeutic purposes and only if its aim is not to introduce any modification in the genome of any descendants.

Where a signatory country does not, or is unable to, make a reservation under Article 36 in regard to this provision, germ-line gene therapy is prohibited. However, Article 13 does not prohibit research into germ-line gene therapy for "preventive, diagnostic or therapeutic purposes," where it does not involve the creation of an embryo (which is prohibited by Article 18(2)). Nonetheless, unless such reservations are made the Convention renders the majority of such research of little practical use.⁸⁴

Many other international instruments share the prohibitive inclinations of the European Convention. For example, Article 24 of the Universal Declaration on the Human Genome and Human Rights states that the

⁸⁰ S. 15(2)(b), Law 35 of November 1988.

⁸¹ S. 15, Medical Research Act No. 488 of 1999.

⁸² Greece has, however, ratified the European Convention on Human Rights and Biomedicine, considered below.

⁸³ Although the US has no federal legislation explicitly addressing gene therapy, the federal Food and Drug Administration (FDA) claims regulatory jurisdiction over the safety and efficacy of such products (see Appendix 5).

⁸⁴ Provisions on genetic research are anticipated in the additional Protocol on Human Genetics currently being drafted by the Council of Europe (see Zilgalvis 2001, 43).

International Bioethics Committee of UNESCO should contribute to dissemination of the principles set out in the Declaration and make recommendations to the General Conference

in particular regarding the identification of practices that *could be* contrary to human dignity, such as *germ-line interventions*. (My emphasis)⁸⁵

Also, Article 6(2)(b) of the European Directive on the Legal Protection of Biotechnological Inventions declares that "processes for modifying the germ-line genetic identity of human beings" are unpatentable. Although disallowing the patenting of such processes does not, itself, prevent their development, it does remove some of the incentive for doing so.

5.9 Conclusion

Despite the complexity of the issues involved, widespread uneasiness and revulsion to cloning and germ-line gene therapy has led many countries to prohibit these technologies. I have argued that legislative prohibition of cloning seems to be an unduly restrictive and paternalistic response, especially since there is a *prima facie* right to reproductive freedom and the main arguments against cloning are based on the misguided idea that the clone has a right not to be cloned. Although prenatal gene therapy is often divided into somatic and germ-line gene therapy, the two are not always morally distinguishable. Further, since the primary argument against prenatal gene therapy relies on its unpredictability, making it likely to cause more harm than it prevents, an absolute prohibition seems too restrictive. If these risks are the only sound reason for prohibition, then this prohibition should be revocable should those risks be satisfactorily removed or addressed. Although my conclusions are only tentative and provisional, certain approaches do appear to be easier to reconcile with the PGC than others. Nonetheless, many issues raised by the goal of prenatal influence still require examination and the next chapter will do just that.

⁸⁵ The Declaration also declares that all procedures affecting an individual's genome should only be undertaken after "rigorous and prior assessment of the potential risks and benefits" (Article 5(a)).

Chapter 6

Prenatal Influence of Traits: Legitimate Goal?

The developing genetic and reproductive technologies are often presented as the latest step in our evolutionary process, i.e., the development of what might be termed "artificial selection." As I have already indicated, there are a number of ways in which the preferences of parents can be satisfied. The most obvious method of prenatal influence is simply to select those individuals, or the genes of those individuals, displaying the desired trait or to select against those individuals with undesired traits or genes. It is also feasible to envisage the prenatal modification of a child's actual or prospective traits using either genetic or environmental manipulation. The techniques discussed in earlier chapters involve variants of such means. This chapter explores the ethical and regulatory issues evoked by the goal itself. In other words, my concern here is to examine the legitimacy of prenatal attempts to influence traits *in isolation from the specific technique used*.

Arguments cloaked in the metaphor of the "slippery slope" (hereafter slippery slope arguments) are frequently invoked against just about all new developments in reproductive and genetic technologies. Although some instances of this argumentative strategy are restricted to one specific technique, there are sufficient common features to devote the majority of this more general chapter to such arguments. I will argue that the majority of slippery slope arguments are insufficiently specified. Nonetheless, I will uphold one particular variant as strong enough to ground a *prima facie* presumption.

Another type of argument almost routinely thrown at new developments in genetic and reproductive technologies is the human dignity argument. This concept will also be analysed in this chapter and a specific conception will be defended.

Finally, this chapter will explore the idea that permissible prenatal treatment must be distinguished from purportedly impermissible genetic enhancement, the issues raised by resource allocation, and Feinberg's "right to an open future." A *prima facie* presumption along the lines of (but wider than) Feinberg's claim will be defended.

6.1 Variants of the Slippery Slope and the Conditions for Soundness

A collection of arguments utilise the metaphor of a slippery slope. These arguments share certain features and seek to convey the idea that pursuing, or not pursuing, a given purpose "A" will metaphorically take us down the slippery slope towards an undesirable result "B." The literature typically utilises such arguments as a means of justifying the prohibition of A. We shall see that such arguments are commonly used with regard to the techniques of prenatal influence as a means of justifying prohibiting the development or use of these techniques.

More generally, slippery slope arguments (understood as feared endpoint arguments) can take two forms with regard to regulation:

- (i) Permitting A will lead to B. Therefore, we ought to prohibit A; or
- (ii) Prohibiting A will lead to B. Therefore, we ought to permit A.

In such arguments A might be morally permissible in itself but B is considered to be a morally impermissible outcome.

A might be said to "lead to" B on either empirical or logical grounds. Thus, slippery slope arguments can be divided into "empirical" and "logical" slippery slope arguments.¹

Empirical slippery slope arguments claim that permitting/prohibiting A is likely to cause or facilitate the occurrence of B. In such arguments the slope's slipperiness depends on the likelihood of B being the end result. Although the link between A and B is empirical/predictive, it might be expressed in a number of ways. It could, for example, be argued that allowing/prohibiting A is likely to lead to B because regulating A in this way will provide the means (or additional means) for nefarious persons to bring about B, or will mobilise irresistible social pressure that is likely to result in B. The slippery slope metaphor seems most appropriate where the empirical link comprises a gradual slide, especially where it is based on the prediction that relevant distinctions will not be made or upheld. However, for convenience, I will use the label "empirical slippery slope" to encompass all types of empirical link between A and B.

At first sight, *logical slippery slope arguments* can be divided into two principal versions. First, there is a *universalist version*, which is merely an

¹ The literature offers many alternatives, but generally complementary, classificatory frameworks. See, e.g., Williams 1985 (who distinguished between "horrible result" and "arbitrary result" slippery slope arguments); Walton 1992 (who distinguishes between "Sorites," "causal," and "precedent" arguments); Lamb 1988 (who discusses a wide range of distinctions); van der Burg 1992 (who distinguishes between "empirical" and "logical" slippery slopes, but utilises different definitions); Holtug 1993 (who supports van der Burg's distinctions); McGleenan 1995 (who distinguishes between logical and rhetorical slippery slope arguments).

instance of the logical principle of universalisability (see 1.2.2, above). According to this version, the justifying reason for permitting or prohibiting A also justifies permitting/prohibiting B purely logically, as A and B are equivalent in all their morally relevant properties (i.e., $A \equiv B$). Second, there is a *gradualist version*, which claims that no non-arbitrary reason can justify drawing a line between A and B. Thus, allowing/prohibiting A will justify incremental steps down the slope until we hit the bottom, B (i.e., $A, A_1 \dots A_n \equiv B$).

In practice, when slippery slope arguments are made, the version in play is not usually explicitly declared, and sometimes an argument will invoke more than one version simultaneously. *The danger with metaphors is that they can suggest different arguments to different people.* There is also the *rhetorical argument*, which is not really an argument at all but merely a rhetorical device warning of the dangers inherent in any new knowledge or technology. In this chapter, I ignore all but those versions of the slippery slope argument outlined above. Also, unless otherwise stated, this chapter will concentrate on arguments that seek to establish that A ought to be prohibited (i.e., type (i) arguments above).²

It follows from the fact that there are numerous types of argument capable of being cloaked by the slippery slope metaphor, each making different conceptual claims, that there are few satisfactory generally applicable stock-responses. Such arguments must, however, satisfy a number of requirements if they are to have theoretical force. First, the bottom of the slope (B) must be a morally impermissible outcome, i.e., a transgression of the PGC. Second, the connection between the top of the slope (permitting A) and the bottom (B) must be supported by relevant argumentation and (in the case of empirical slippery slope arguments) empirical evidence.

More specifically, a satisfactory empirical slippery slope argument must establish that

- (a) it is morally impermissible to allow the occurrence of B;
- (b) there is sound empirical evidence of the slope's slipperiness, i.e., that allowing A is likely to lead to B;
- (c) there is no morally acceptable or preferable way of avoiding the slide down the slope once A is permitted; and
- (d) the moral desirability of permitting A does not outweigh the risk of B occurring.

² The vast majority of what I say will, however, also apply to type (ii) arguments. One example of a type (ii) argument is the claim that prohibiting research into new genetic techniques will mobilise researchers creating a gradual brain-drain, whereby talented researchers move to less restrictively regulated countries. See Chapter 7.

Condition (a) is shared by all slippery slope arguments, simply because their force rests on the idea that the bottom of the slope is something that cannot be permitted.

Condition (b) is specific to empirical slippery slope arguments and involves demonstrating that allowing *A* will indeed facilitate or cause the occurrence of *B*. This often requires more than a mere suspicion that *B* might occur, as the strength of such arguments is related to the likelihood of the predicted outcome occurring. The empirical link between allowing *A* and *B* occurring can be long or short, direct or incremental. To use a domino analogy, the length of a slippery slope can be analogised to the number of dominoes lined up. Just as the likelihood of the last domino falling will depend on the weakest (i.e., least likely to fall) linking domino, the strength of a slippery slope argument will depend on the weakest empirical premise.

Condition (c) merely requires consideration of alternative ways of preventing *B*. If, all things considered, any alternative to prohibiting *A* is more likely to prevent the occurrence of the unacceptable outcome (*B*), or is in any way morally preferable to prohibiting *A*, then that alternative ought to be pursued instead. Difficulties satisfying this requirement will become clear when examples of empirical slippery slope arguments are explored below. The basic difficulty is a familiar one—applying the *PGC* to multivariable conflicts.

Condition (d) requires consideration of the moral benefits of allowing *A*. Any empirical slippery slope argument not satisfying this requirement—or, indeed, requirement (c)—will invite *reductio ad absurdum*, because of the inherent ability of humanity to use (just about) anything for an immoral purpose. The arrival of germ-line gene therapy will provide another means for evil dictators to conduct large-scale eugenic programmes. The creation of the World Wide Web provided a means of disseminating bomb-making instructions to evil terrorists. The discovery of fire created a means of deliberately burning others. However, germ-line gene therapy also brings the potential to prevent some otherwise fatal conditions, the World Wide Web brings the potential to disseminate medical and educational information, and fire has the potential to prevent people from freezing. If empirical slippery slope arguments are sound without the need to address the potential benefits of allowing the relevant activity, then they require the prohibition of every new development. Indeed, they would require regression to a state of being that is incompatible with human freedom of action, simply because human freedom enables the occurrence of immoral outcomes.³ This outcome cannot be supported by the *PGC*, because it is incompatible with the possession and exercise of the generic rights.

³ This point is also made in Beyleveld 1997 with regard to what the author terms “tendential slippery slope arguments.”

Two versions of logical slippery slope arguments were also outlined above, i.e., the universalist and gradualist. Where *B* is a genuinely immoral outcome, the universalist version presents no theoretical difficulties insofar as permitting *A* logically entails permitting *B* because *A* and *B* share the relevant moral properties. In practice, what is more difficult is demonstrating that *A* and *B* do indeed share the relevant moral properties. Therefore, the universalist version can only be the last step of an argument for prohibiting *A*. Also, since the link between *A* and *B* is direct and purely logical, the metaphor of the slippery slope again seems inappropriate.

The gradualist version claims that once *A* is permitted there is no morally defensible stopping point until the arrival of outcome *B*, so that allowing *A* will justify incremental steps down the slippery slope until we reach a point that is equivalent to *B*. Where such a claim merely demonstrates the equivalence of *A* and *B* (i.e., that the reason for prohibiting *B* applies with equal force to *A*), it reduces to the universalist argument.

Another argument capable of being presented in such terms relies on definitional or epistemic uncertainties. If the distinction between *A* and *B* (or the reason for drawing such a distinction) does not itself provide a determinate cut-off point, some might wish to suggest that we are logically required to take steps down the slope towards *B*.⁴ However, if there is a reason (of appropriate weight) for distinguishing *A* and *B*, then the absence of a determinate cut-off point will justify upholding an otherwise arbitrary cut-off point, rather than treating *A* and *B* as equivalent.

This is best explained using an example. For the sake of argument, let's assume that, because of the (empirical and moral) uncertainties presented when trying to balance the need for quick and convenient travel with the need to limit road accidents,⁵ a 29 miles per hour urban speed limit is insignificantly different from a 30 limit, which in turn is insignificantly

⁴ Some uses of the slippery slope metaphor suggest the Sorites paradox—“if one grain of sand is not a heap and one more does not make it a heap, there can never be a heap.” This trades on vagueness and ambiguity. Only where one operates without a definition of a heap—or with a definition that can never be satisfied—will it be the case that “there can never be a heap.” A group of sand grains can only be given the label “heap” if one has a precise definition of a heap (say, five or more grains) or a visual image of a heap (which, if insufficiently precise, will create a range of situations for which there is no non-arbitrary way of determining whether the term applies). Thus, in my view, all the Sorites paradox demonstrates is that loose terms produce grey areas. The absence of a distinction cannot be implied from the absence of a determinate cut off point.

⁵ The *PGC* requires such a balance to be made. The availability of quick and convenient travel is required to protect and advance the generic needs of those living in modern, vehicle dependent societies, but vehicular accidents can also cause generic harm to possible agents.

different from 31 miles per hour.⁶ Here, the lack of a sharp dividing line does not require these speeds to be treated as equivalent nor does it demonstrate the unacceptability of speed limits. Where there is a moral reason (of appropriate weight) for upholding an otherwise arbitrary stopping point, any chosen stopping point consistent with that moral reason will be defensible as long as it is chosen by a morally defensible procedure. Thus, any chosen speed limit will be defensible as long as it represents a competent attempt to balance competing needs by an appropriate regulatory procedure or body (see 4.1). As argued in 4.1, epistemic uncertainties are inescapable features of decision-making. Also, blanket refusals to uphold relevant distinctions, simply because they fail to provide clear cut-off points, will produce immoral outcomes.

In sum, arguments cloaked by the metaphor of the slippery slope can be reduced to those making predictive claims and those relying (directly or indirectly) on the logical principle of universalisability. If these are to have rational force, certain conditions must be satisfied. These require rationally adequate argument for accepting the morally impermissibility of *B* and the strength of the logical/empirical connection between allowing *A* and reaching outcome *B*.

Before moving on to examples of the type of arguments that I have in mind, I wish to make one final point. It might be objected that my classificatory framework is too wide, as it captures arguments that are not really slippery slope arguments at all—it captures all feared endpoint arguments. The slippery slope metaphor might, for example, be plausibly restricted to a sub-category of what I have called the empirical slippery slope, i.e., situations where *A* is likely to lead to *B* because of failure to make or uphold relevant distinctions. Such an objection would be purely terminological. A metaphor, by its nature, is ambiguous and, in the end, it makes little difference whether or not its use is considered appropriate. As defined, the empirical and logical universalist arguments are argumentative strategies capable of being applied to the subject matter of this book.

6.2 Slippery Slopes and the Techniques of Prenatal Influence

6.2.1 Prohibition or Restriction of the Techniques

Many slippery slope arguments have been used to support a prohibition of specific techniques of prenatal influence.

⁶ In reality, a rounded number might be easier for drivers to remember, resulting in greater observance. However, if cars were programmed to stay within speed limits, without the driver's input, this consideration would not arise.

A logical gradualist slippery slope argument is considered by Berger and Gert, who state that an

argument against gene therapy is that if we use the procedures to cure sickle cell anemia and other genetic disorders, we will be unable to draw the line against using gene therapy to improve our species. This is an example of what is known as a "slippery slope" argument. The argument involves denying that a non-arbitrary line can be drawn between negative and positive eugenics, and therefore to protect against positive eugenics, we should not even start with negative eugenics. (Berger and Gert 1991, 674)

Berger and Gert go on to claim that such a line can be drawn, i.e., there is a defensible stopping point between permitting *A* and the occurrence of *B*.⁷ They believe that a defensible line is provided by the concept of a malady, defined as "[d]eath, pain, disability, and the loss of freedom or pleasure" (ibid., 672). They argue that using "gene therapy for these maladies would constitute negative eugenics" (ibid., 671), and using gene therapy for other traits and conditions would constitute positive eugenics. They aver that maladies are universal evils requiring removal,

The avoidance of evils, unless there is a reason, does not seem to depend on any particular culture, politics, or personal preference, but seems to be generally universal. The existence of such evils provide explicit objective criteria that we may apply in distinguishing maladies from non-maladies. (Berger and Gert 1991, 672)

However, widespread appeal is not the same thing as justification and, even if values in favour of allowing "negative eugenics" are rationally supportable, this does not demonstrate the need to draw a line between "negative" and "positive" eugenics. As stated above, it also needs to be established that *B* is morally impermissible. The moral permissibility of so-called "positive eugenics," and indeed so-called "negative eugenics," will be explored in 6.4.1.

Arguments capable of being read as empirical slippery slope arguments are prevalent in the literature. Two specific instances spring to mind, the second of which will be explored in 6.2.2. The first rests on the claim that allowing the development and use of the techniques of prenatal influence will

⁷ The argument explored by Berger and Gert would have been an empirical slippery slope if they had claimed that allowing negative eugenics is likely to lead to positive eugenics because, in practice, the relevant distinctions will not be made or upheld. Instead, the argument that they address denies that a distinction between *A* and *B* can be made.

lead to genetic enhancement or eugenics. Anderson summarises an example in favour of prohibiting somatic gene therapy,

Successful somatic cell gene therapy also opens the door for enhancement genetic engineering, i.e., the supplying of a specific characteristic that individuals might want for themselves (somatic cell engineering) or their children (germline engineering) which would not involve the treatment of disease. (1989, 682)

William Gardner presents a slightly more detailed example,

It is widely feared that human gene therapy is at the top of a slippery slope, such that therapeutic engineering of human genes will generate technological change of such momentum that it will force the adoption of genetic enhancement. (1995, 65)

Also, in March 1997 the European Parliament passed a resolution on cloning animals and human beings in which it denounced cloning "as it permits eugenic and racist selection" (Bulletin of Medical Ethics 1997, 10).⁸

It has been argued above that claims such as these, need to address the benefits of allowing *A*. It is not self-evident that the moral desirability of permitting *A* in these examples cannot outweigh the risk of *B* occurring. The arrival of knowledge and technological developments capable of being used for evil is an unavoidable side effect of human freedom, and should not be prohibited unless there is no legitimate purpose for which the knowledge or technology could be used, or the potentially beneficial purposes are not sufficient to legitimate running the risk of *B*. I suggest that this is the reasoning behind Harris' claim that,

To ban cloning on the grounds that it might be used for racist purposes is tantamount to saying that sexual intercourse should be prohibited because it permits the possibility of rape. (1998a, 32)

The other conditions of a satisfactory empirical argument, set out above (6.1), are also not easily satisfied by these examples. Having a fear that permitting *A* will causally lead to *B* is not the same thing as having empirical evidence that this is likely to be the case and empirical evidence supporting

⁸ For yet another example of an empirical slippery slope argument—"that allowing research on embryos created by cell nuclear replacement would be a first step on a 'slippery slope' towards human reproductive cloning"—see Department of Health 2000a, para. 21, 8. This particular example is rejected on the basis that the stringent controls of the UK legislation are sufficient to prevent the slide. Ironically, this UK legislation was later shown to be inadequate, see 5.3.

this prediction is rarely offered. This is particularly relevant to the example presented by Gardner. This is important because the strength of such arguments will be proportional to, among other things, the likelihood of *B* occurring. Occasional vague references to the evils of the Nazi regime are not sufficient to establish a link between allowing gene therapy and eugenics. There are many factors standing in the way of the slide predicted in the above examples, not least the unpredictability of both gene therapy and cloning and its inevitably high financial cost. Also, detailed consideration needs to be given to the alternative ways of preventing the slide towards *B* once *A* is permitted. All this is assuming that the bottom of the alleged slope—genetic enhancement—is indeed a morally impermissible outcome. This needs to be established. Against this conclusion Harris (1998a, 171–174) argues that there is no obvious moral difference between social enhancement and genetic enhancement, and social enhancement by education is routinely accepted and encouraged. I will return to this issue in 6.4.1, below.

Gardner presents a more complex empirical slippery slope argument of his own, arguing that a ban on genetic enhancement will not be sufficient to prevent its occurrence. He argues that nations and parents will have strong incentives to defect from a ban on human genetic enhancement to give themselves a competitive advantage, which is likely to mobilise pressure that will undermine any ban on genetic enhancement. This argument concludes with the surprisingly uncontroversial conclusion that those

who hope to prohibit enhancement must carefully consider what legal and political mechanisms, national and international, will be sufficient to enforce that prohibition. (1995, 80)

The bottom of this argument's slope, the undermining of any ban on genetic enhancement, will clearly be considered morally unacceptable by those who wish to prohibit genetic enhancement. Given Gardner's limited conclusion, the failure to cite empirical evidence does not appear to be overly problematic. Nonetheless, it must first be established that genetic enhancement ought to be prohibited (see 6.4.1).

The major issue with regard to all slippery slope arguments is establishing that the bottom of the slope is, indeed, morally impermissible. The strength of the empirical evidence necessary to establish a link between allowing *A* and the occurrence of *B* will be proportional to the moral iniquity of *B*. After all, precautionary reasoning, requiring the risk of violating the *PGC* be minimised, could justify reliance on inconclusive (but persuasive) empirical evidence. Much of the remainder of this chapter will, therefore, concentrate on the alleged immoral outcomes potentially sitting on the bottom of slippery slopes. Before this, however, we need to explore a more prevalent and persuasive empirical slippery slope argument.

6.2.2 The Dominant Empirical Slippery Slope Argument Against Trait Selection

The most prevalent empirical slippery slope argument in this context claims that *allowing prenatal influence of certain traits is likely to encourage or facilitate harm to those with the rejected traits, those without the chosen traits, or the families of such persons*. This argument has been made with regard to selection for or against numerous traits.

It has been made with regard to selection against traits associated with disabilities,

[A]n increase in genetic testing and the availability of PGD might affect people's attitudes towards disabled people and their families by creating a climate where genetic disability is increasingly seen as preventable. (HFEA and ACGT 1999, para. 20)

The Danish Council of Ethics used a similar argument with regard to allowing fetal diagnostics to be used to avoid the birth of children with physical disabilities,

Fetal diagnostics may also be feared to fuel an unwillingness to provide care and display tolerance towards those who do not match increasingly narrow parameters of performance and ability to function. The fear is, then, that fetal diagnostics is contributing to the trend in social development towards what might be called "social brutalization", in which people are sorted into worthy and inferior, desirable and undesirable categories. (1999, 56)

This form of slippery slope is often used to suggest that sex selection is likely to encourage or facilitate sexual discrimination and prejudice, and race selection is likely to encourage racism.⁹ It has also been suggested that the general preference for heterosexual children is even stronger than preference for a child of a particular sex, and those who seek to influence the sexual orientation of their child before its birth are likely to contribute to homophobic attitudes. According to Stein,

By strengthening the disease view of homosexuality and increasing pressure to keep one's homosexuality secret, the use of orientation-selection procedures would engender and perpetuate (1) attitudes that lesbians and gay men are undesirable and not valuable, (2) policies that discriminate against lesbians and gay men, (3) violence against lesbians and gay men, and (4) the very conditions that give rise to the preference for heterosexuals rather than non-heterosexuals. (1998, 16)

⁹ This latter ground might be the reason why the Spanish legislation prohibits cloning only when it is aimed at race selection, see 5.3.

Further, Beyleveld (2000b) argues that the ability to select for or against traits that are irrelevant to the possession of intrinsic moral status might cause fashions for particular traits to develop, so that these traits become regarded as conditions meriting medical intervention. He cites

the example of the desire for perfectly shaped teeth that has swept the US, resulting in children whose parents are unable to afford the treatment that can correct 'imperfections' that are now perceived as deformities, suffering deep traumas as a result. (ibid., 474)

The bottoms of these slippery slopes all involve uncontroversial violations of the *PGC*. Since agency-irrelevant disabilities (such as impaired motor capacity, sight, or hearing), sex, race, and sexual orientation are all examples of traits that are irrelevant to the possession of intrinsic moral status, prejudice against agents who either have certain variants of these traits or are related to those who have, will involve violation of the *PGC*.

Empirical support for the predictions on which these arguments rest can be found in past examples of trait selection. For example, there is evidence that in Sardinia, where there is routine PND for thalassaemia, women who fail to abort a fetus diagnosed as having the condition are stigmatised by the local community (see Black 1998, 45). The empirical evidence does indeed suggest that gradually increasing social pressure is a realistic consequence of widespread trait selection. This social pressure is also likely to be directed towards children with the undesired genes, rather than being restricted to the parents of such children. As one commentator has warned

the very language used to discuss genetic disease leads us to the easy but wrong conclusion that the afflicted fetus or person is rather than has a disease . . . [W]e easily slide from the language of possession to the language of identity, from "he has hemophilia" to "he is a hemophiliac," from "she has diabetes" to "she is diabetic," from "the fetus has Down's syndrome" to "the fetus is a Down's." This way of speaking encourages the belief that it is defective persons (or potential persons) that are being eliminated, rather than the disease. (Kass 1988, 89)

A culture of testing might also have more widespread consequences with regard to the ability to get employment, insurance, or social standing of those with the rejected traits, especially if persons with such undesired genes become regarded as diseased. A notorious example of genetic testing leading to illegitimate discrimination occurred in the 1970s when the US Department of Defence carried out a policy of excluding individuals with the sickle cell trait—i.e., people who, having only one copy of the sickling allele, will not get sickle cell disease. This policy was pursued on the basis that this trait put them at risk of collapsing at high altitudes, whereas only sickle cell

disease¹⁰—i.e., possession of two copies of the sickling allele—was known to have this effect (see Kitcher 1996, 130–132). Admittedly, since only native Africans and those of African descent usually possess the sickling allele, there might have been other prejudices behind this policy. Nonetheless, once a trait or condition is perceived as a preventable disease, negative associations attributable to that trait or condition are likely to increase.

It is also plausible that those prospective parents who seek to avoid the birth or conception of a child with a specific trait who, despite all their efforts, have a child with this undesired trait are likely to value this child less than they would have valued a child without that condition. Thus, trait selection could facilitate and increase parental resentment and pressure on those children who have undesired traits. This seems to be the most plausible interpretation of popular claims that selecting and designing children will reduce children to consumer products (see, e.g., BMA 1998, 59). If the characteristics of children are perceived as being subject to prior choice, those children not conforming to those choices could become regarded as defective in the same way that a consumer good would be regarded as defective if it failed to reach expectations. Thus, some trait selection can facilitate the development of a culture whereby all children become perceived as consumer goods with attendant expectations.

Wielding relevant empirical evidence will not, however, be sufficient to establish the soundness of this type of argument. It also needs to be established that the moral benefits of permitting attempts to influence an undesired trait do not outweigh the harm caused by running the risk of such social pressure occurring. Where, for example, the occurrence of the trait is likely to impose onerous burdens on the prospective parents, running the risk of increased social prejudice might be defensible as an unavoidable side effect of avoiding harm to the prospective parents, perhaps, until supportive social mechanisms for alleviating parental burdens are in place. To take just one example, where prospective parents have already endured the emotional and financial hardship of raising a child with a condition such as Down's syndrome, or even a treatable condition such as PKU, the possibility that attempts to avoid the birth of second child with this condition might generate social pressure towards others is far from morally conclusive.¹¹ In short, the moral issues are often so complicated that even a high likelihood of harm as a result of consequential social pressure will not by itself be enough to establish the impermissibility of permitting trait selection.

Insofar as the argument under discussion has force, with appropriate modifications, it can also apply to techniques such as germ-line gene therapy and prenatal environmental manipulation (see Pattinson 2000). The only difference between these techniques and PGD/PND is that successful

prenatal modification using gene therapy or environmental manipulation has the potential to benefit the subject, by removing or limiting harm caused by the possession of deleterious traits, whereas PGD and PND usually involve the destruction of rejected subjects. Thus, for this argument to apply to prenatal modification, rather than diagnosis and testing, the risk of sliding to the bottom of the slope must also be weighed against the potential benefits of the techniques to the subject (see 6.1).

Where, however, prenatal modification is used to modify traits that would not harm the subject, the risk of turning a non-harmful trait into a trait that is perceived as harmful or undesirable has force. If this outcome occurs, then generic harm will be inflicted on those with the now harmful traits and probably the parents or families of those who choose not to use prenatal modification to avoid the occurrence of such traits.

All these arguments need to establish that any consequential social pressure could not be confined by other means. After all, the true villain is illegitimate societal pressure, generating a desire to avoid certain traits and pressure towards those who do not conform. Such social pressure might be legitimately deflected from parents by, for example, principled eligibility requirements restricting access to the techniques of prenatal influence.¹² Nonetheless, plausible mechanisms for avoiding the predicted harm are not over abundant.

Despite the reservations raised, there is at least a *prima facie* defensible argument that prenatal influence of the above mentioned traits is likely to encourage the violation of the generic rights of (ostensible) agents. Thus, the starting presumption should be in favour of regulatory mechanisms restricting prenatal influence of traits that are irrelevant to the possession of moral status—and, in the case of prenatal modification, do not harm the subject—as a means of avoiding or limiting violations of the PGC. Where the trait is one that is relevant to possession of intrinsic moral status, in the sense of limiting the moral status of the subject (as in the case of anencephaly and severe mental retardation), this presumption is much weaker or absent.

6.2.3 Empirical Slippery Slopes and Sex Selection

It is commonly assumed that sex selection to avoid the birth of a child with a severe X-linked condition (such as Lesch-Nyhan syndrome) is permissible, but to choose the sex of a child for, what are often termed, social reasons is not. This has led many regulatory bodies and instruments to allow sex

¹⁰ Sick cell disease is also known as sickle cell anaemia.

¹¹ A parent might even possess the undesired trait his or herself.

¹² It is argued in Beylveled and Pattinson 2000b that the present eligibility requirements for access to assisted reproductive techniques are far from principled.

selection only where it is aimed at preventing the birth of a child with a serious X-linked condition (see 4.3.2 and 4.4.1).

As emphasised throughout, the benefits of satisfying the preferences of prospective parents must be taken into account. Sex selection can prevent severe harm and distress for some couples facing a significant risk of having a child with a serious X-linked condition. However, predictable harm to prospective parents is not limited to fears of serious X-linked conditions. In some circumstances having a child of one particular sex might cause the parents to be stigmatised or ostracised by their community, or to suffer from the effects of an overwhelming desire to have a sex-balanced family. Thus, the rights and interests of prospective parents can undercut the distinction between sex selection to avoid disease and sex selection for social reasons.¹³

An example of a couple with an overwhelming desire for a sex-balanced family recently attracted the attention of the UK media. Alan and Louise Masterton sought medical help to ensure that their next child would be a girl after losing their daughter in a bonfire accident. They already had four sons and had tried for 15 years to have the daughter whose life was taken by the accident only three years later. The UK regulatory body, the Human Fertilisation and Embryology Authority, refused to make an exception to their policy of restricting sex selection to the avoidance of X-linked diseases (see 4.4.1). Predictably, many invoked the slippery slope metaphor (see, e.g., *The Sunday Telegraph* 2000). When used to convey what I have called the "empirical slippery slope," this metaphor can be used to present a number of arguments against sex selection (especially where it is performed for social reasons).

One rests on the claim that sex selection will encourage the treatment of the rejected sex as a harmful trait. This type of argument was supported above (6.2.2). Here, this argument is bolstered by the likelihood that sex selection could display and encourage gender-role expectations. According to this argument, selection for social reasons is likely to display and encourage sexual stereotyping—as even a desire to have a balanced family is likely to hide the assumption that a child of the missing sex would have behavioural traits attributable to members of that sex only and the satisfaction of such desires can aid their perpetuation. Insofar as gender expectations are likely to lead to disapproval and disregard for those whose behaviour does not conform to certain morally optional behavioural patterns, such sexual stereotyping is likely to impermissibly endanger the rights of

¹³ Justifying sex selection for any reason requires reliance on the potential generic harm that is likely to be suffered by the prospective parents. The prospective parents must be offered counselling. Otherwise they are likely to suffer even greater generic harm if, despite the use of selection techniques, their hopes and expectations are frustrated by the birth of a child of the undesired sex. After all, diagnosis of sex (especially before implantation) is not 100% accurate.

agents. Although these claims require empirical support, they are clearly plausible.

Thus, there are strong *prima facie* reasons why sex selection for social reasons might be morally illegitimate, suggesting that a presumption against this practice ought to be adopted. These reasons will be bolstered if the additional claim concerning gender expectations is borne out by empirical research. Nonetheless, such a presumption must be subject to the contingencies of possible harm to the prospective parents.

Another empirical argument capable of being invoked against sex selection claims that it can create an imbalance in the sex ratio to the detriment of society. This argument has some empirical support. For example, sex selection (currently using PND)

has contributed to India's declining proportion of females to males; the ratio dropped from 935:1000 in 1981 to 927:1000 in 1991. In certain communities in the northern states of Bihar and Rajasthan the ratio has plummeted to 600:1000, one of the lowest in the world. (Mudur 1999, 401)

However, the idea that sex selection will create an imbalance between the sexes to the detriment of society must be tempered by a number of considerations. First, it is likely that any short-term imbalance will be self-rectifying, as social pressures are likely to create a demand for the minority sex. Second, the alleged consequential harm must be carefully specified, because there can be no right to have equal sex ratios, because of the costs inherent in a duty to bring this about.¹⁴ Thirdly, it must not be assumed that the natural balance—which at birth is usually slightly weighted towards males—is automatically morally preferable. Therefore, this particular slippery slope argument is much weaker than is commonly assumed.

6.3 Human Dignity

6.3.1 Conceptions of Human Dignity

Like the slippery slope argument the human dignity argument comes in many flavours. For a start, human dignity can be used in a way rendering it equivalent to intrinsic moral status, so that those possessing dignity are those who have moral worth entitling them to concern from others. I will call this the *intrinsic worth conception*. This intrinsic worth can be given a *duty-based* or a *rights-based* orientation. A duty-based orientation (as in Kantian moral theory) renders it possible for agents to compromise the dignity

¹⁴ Positive rights are subject to a number of limitations, see 2.7.

(understood here as intrinsic worth) of not only others but also themselves.¹⁵ The idea being that an agent compromises its dignity by violating its duties to itself. Following the Gewirthian presuppositions of this book, this conception of human dignity is to be rejected in favour of a rights-based conception, as there can be no direct duty not to compromise one's own dignity under the *PGC*. This follows from the waivability of the benefits of the generic rights of agents, rendering it meaningless for an agent to have a right (imposing a correlative duty) against itself.¹⁶ Interpreted in this way, the concept of human dignity can be seen to underpin all the arguments on the application of the *PGC* in this book, rendering the term superfluous. The term "human dignity" used in this way will, of course, have to be interpreted as "agent-dignity."

Human dignity can also be given a narrower focus. Interpreted narrowly, a violation of human dignity involves denying a possessor of intrinsic moral value its status. Within a Gewirthian context, to violate human dignity in this way is to deny the rights-bearing status of an agent. This interpretation is narrower as although all attempts to deny the status of a possible agent will violate the *PGC*, not all the generic rights are concerned with the subject's status as a rights bearer.

Accordingly, claims that certain techniques of prenatal influence violate human dignity by treating the subject as a mere means rather than an end in itself, must be read as claims that either the subject's generic rights are violated by the technique or its status as a rights-bearer is denied. The idea that certain techniques (particularly cloning techniques) involve using individuals as a means to the ends (or purposes) of others—sometimes referred to as "instrumentalisation"¹⁷—has widespread appeal.¹⁸ For

¹⁵ On duties to oneself in Kant, see Kant 1797 as translated in Gregor 1996, 209. See also Beylveled and Brownsword 1998, especially 75–77.

¹⁶ See Chapter One. There are, however, indirect/vicarious duties to one's self. Arguments to establish such duties have already been analysed with regard to the idea of indirect moral status in 2.6.2. See, also, Gewirth 1978, 333–338.

¹⁷ Often the principle appealed to is Kant's Formula of the End in Itself of his Categorical Imperative,

Act in such a way that you always treat humanity, whether in your own person or in the person of any other, never simply as a means, but always at the same time as an end. (Kant 1785 as translated in Paton 1948, 91)

In Kantian (and Gewirthian) theory the only relevant persons are agents (i.e., setters of ends), not merely possessors of interests. However, many of those who appeal to this principle wish to extend it to encompass non-agents.

¹⁸ See HGAC and HFEA 1998b, para. 4.5 and CCNE 1997. The latter states,

Reproductive cloning of human beings is therefore unacceptable not just because of its foreseeable effects on the human condition, but also because the very ends in the name of which certain people believe they can justify the scheme is

example, the preamble of the Council of Europe's Additional Protocol to the Convention on the Prohibition of Cloning states that,

Considering however that the instrumentalisation of human beings through the deliberate creation of genetically identical human beings is contrary to human dignity and thus constitutes a misuse of biology and medicine.

This raises issues already addressed. Since the mere act of cloning cannot be taken to violate the rights of the cloned individual, on the basis that the clone cannot be assumed to have suffered any generic harm (see 5.2.1), the clone's dignity cannot be violated by the mere use of cloning technology.

The idea of human dignity also conveys the idea of *dignified conduct or character*. I will call this the *virtue conception*. This conception can be given a strong or weak interpretation. The strong interpretation, underpinned by virtue theory, claims that to be dignified is to be a virtuous person. This interpretation rejects the moral assessment of conduct in favour of the moral assessment of persons, or more precisely, the character of persons. In contrast, the weak interpretation is compatible with conduct-assessing, action-based morality. According to the weak interpretation, dignified conduct is conduct in compliance, or disposing towards compliance, with moral principles. This conception was defended as being supported by the *PGC* in 2.6.2 (see also Gewirth 1978, 332–333). In contrast, the strong conception, requiring the rejection of action-based morality, is incompatible with the *PGC* as an action-based morality. It must, therefore, be rejected if the argument to the *PGC* is taken to be sound, as it is in this book.

As with slippery slope arguments, this classificatory framework is not conclusive. There is at least one other conception, the *rhetorical conception*, which does not purport to be an argument at all but a warning that something appears to transgress moral boundaries. It is, perhaps, this version that Harris had in mind when declaring that "[a]ppeals to human dignity, while universally attractive, are comprehensively vague" (Harris 1998a, 31).

In sum, popular conceptions of human dignity reflect the tensions within moral theory. The concept is linguistically flexible enough to allow deontological, teleological, virtue theory, moral relativist, and rhetorical conceptions. Under the *PGC*, however, human dignity must be interpreted in its *rights-based conception*, which encompasses the *dignified conduct virtue conception*.

tantamount to making an end in itself of cloning as opposed to the clone. In this way, there would necessarily be an instrumentalisation of the person to be born.

6.3.2 Human Dignity as Invoked in Regulatory Frameworks

Many international instruments give the now almost mandatory nod in the direction of human dignity and human rights, reflecting the growing consensus that human endeavours should respect these concepts. With regard to the techniques of prenatal influence, human dignity is specifically mentioned by, for example, the preambles of the Convention on Human Rights and Biomedicine¹⁹ and UNESCO's Universal Declaration on the Human Genome and Human Rights. It is, however, a concept whose precise formulation is often left vague and undefined (see, e.g., Harris 1998a, Harris 1999, 66; 31; Beyleveld and Brownsword 1998, 71).

Where human dignity has been given constitutional enactment, constitutional courts have given it a more precise formulation. For example, the German Basic Law—which has formed the common constitution of the now unified East and West Germany since 1990—has a provision requiring the state to “protect the dignity of man,”²⁰ which has been interpreted by the Federal Administrative Tribunal in terms of the *duty-based conception* of human dignity.²¹ A similar interpretation has been given by the French *Conseil d'Etat*, deriving the need to protect human dignity from the constitutional provision requiring protection of “*ordre public*” (see Beyleveld and Brownsword 1998, 70).

Of the techniques of prenatal influence, cloning and germ-line gene therapy are often presented as contravening human dignity. For example, in March 1997 the European parliament passed a resolution declaring that cloning “offends against human dignity.”²² UNESCO clearly support this view as Article 11 of its 1997 Declaration on the Human Genome and Human Rights, states that,

Practices which are contrary to human dignity, such as reproductive cloning of human beings shall not be permitted.

Also, Article 24 names germ-line inventions as an example of a technique that “*could be* contrary to human dignity” (my emphasis).

¹⁹ Also, Article 1 states that,

Parties to this Convention shall protect the dignity and identity of all human beings . . . with regard to the application of biology and medicine.

²⁰ Article 1(1) sentence 2 of the Basic Law, as translated in Vitzthum and Kämmerer 1999, 308.

²¹ See the *Peep-Show Decision*, BverwGE, 247 (1981), as discussed in Beyleveld and Brownsword 1998, 70.

²² For this Resolution and the earlier Resolution of 28 October 1993 see Bulletin of Medical Ethics 1997.

In this context, the Fourth Revision of the Portuguese Constitution of 1997 introduced two provisions seeking to protect human dignity.²³ First, Article 26.3 states that,

The law shall guarantee the *personal dignity* and *genetic identity* of the *human being*, particularly in the creation, development and use of technology and in scientific experimentation. (My emphasis.)

Second, Article 67.3(e) states that the State has a duty to protect the family, in particular by “regulating assisted procreation, in such terms as safeguard human dignity.” Given the widespread belief that germ-line gene therapy and cloning violate human dignity, these provisions are likely to affect the legality of these techniques. Moreover, since Article 26.3 specifically states that human dignity is to be protected “in scientific experimentation” this might have knock on effects with regard to embryo research. As far as I am aware, the Portuguese constitutional court has yet to interpret these provisions. Nonetheless, it is likely that jurisprudence from other continental constitutional courts, such as those of France and Germany, could be influential.

The flexibility of human dignity as a label also allows it to be used by those who argue for the greatest possible reproductive freedom. For example, Robertson argues that procreative liberty is of central importance to individual meaning, *dignity*, and *identity*” (Robertson 1994, 16, my emphasis).

For our purposes, however, the mere assertion that cloning, germ-line gene therapy, and repressed reproductive autonomy, threaten to contravene human dignity is not enough. In fact, without more it is frankly question-begging. The next section will explore a concept that is often said to violate human dignity and rest at the bottom of slippery slope arguments, i.e., genetic enhancement.

6.4 Prenatal Enhancement

6.4.1 Is Prenatal Enhancement Morally Pernicious?

We have seen that a distinction is often drawn between acceptable and unacceptable prenatal intervention. The purportedly acceptable is often labelled treatment, curing, or therapy, whereas the supposedly unacceptable

²³ I am relying on an English translation of the Constitution of the Portuguese Republic (Constitutional Law no. 1/97 of 20 September 1997), http://www.parlamento.pt/leis/constituicao_ingles/crp_uk.htm. I am grateful to João Carlos Loureiro for drawing my attention to these provisions in personal communication.

is dismissed as non-therapeutic, enhancement, or eugenics. Sometimes this contrast is described as negative versus positive eugenics, disease versus non-disease, or serious versus non-serious disease. Sometimes these distinctions are claimed to be identical, sometimes they are claimed to be distinct, but they are all distinctions between the purportedly acceptable and unacceptable. Where a slippery slope argument is invoked the bottom of the slope is often claimed to represent this category of the impermissible, i.e., genetic or eugenic enhancement.

It has, for example, been argued that only therapeutic uses of genetic and reproductive technologies fall within the boundaries of legitimate medical practice or health care need (see, e.g., Anderson 1989; Baird 1994). Various national and international bodies also appeal to this type of reasoning. For example, the Canada Tri-Council Policy Statement declares,

The aim of genetic research should be to advance knowledge or to alleviate disease, not to "improve" or "enhance" a population by cosmetic manipulation. (Medical Research Council of Canada *et al.* 1998)

We are asked to defer to a commonly held intuition that prenatal genetic influence can only be legitimately used for a limited category of traits. It is commonly assumed that preventing a child being born with a severely disabling disease/condition (such as cystic fibrosis or Lesch-Nyhan syndrome) is morally permissible, or even morally required, whereas it is morally impermissible to attempt to avoid or ensure the birth of a child with a desired eye colour, sex, or artistic talent. Between these two intuitively appealing extremes rest the more controversial instances, such as attempts to influence the occurrence of Down's syndrome, achondroplasia (dwarfism), or homosexuality. There are a number of points to make about distinguishing between supposedly permissible treatment from supposedly impermissible enhancement in this way.²⁴

First, this category of impermissible enhancement appears to be equally applicable to postnatal social manipulation by education (see Harris 1998a, 171–174). Against the equation of social and genetic engineering Kass argues that the techniques of

so-called social engineering with man as their object, used by one generation to mold the next... are feeble and inefficient when compared to those [developing genetic and reproductive technologies] on the horizon... The traditional influences operate by speech or by symbolic deeds. They pay

tribute to man as the animal who lives by speech and who understands the meanings of actions. Also, their effects are in general, reversible, or at least subject to attempts at reversal. Each person has greater or lesser power to accept or reject or abandon them. Biomedical engineering, on the other hand, circumvents the human context of speech and meaning, bypasses choice, and goes directly to work to modify human material itself, and the changes wrought may be irreversible. (1998, 18–19)

No empirical evidence is cited in support of the claim that social manipulation is more reversible and it appears to be an over generalisation. One only has to perceive the effects of societally and parentally instilled values and religions, which once internalised are just about impossible to dislodge without severe psychological harm and instability. Also, the realisation of technologies such as germ-line gene therapy is so distant that somatic gene therapy might then offer a degree of reversibility. Moreover, no manipulation performed on a child before it has the ability to voluntarily consent pays "tribute to man... who understands the meanings of actions" any more than prenatal genetic manipulation does.

Another argument attempting to refute the claim that prenatal genetic enhancement is impermissible is presented by Harris, who states that,

It seems to me to come to this: either such traits as hair colour, eye colour, gender, and the like are important or they are not. If they are *not* important why not let people choose? And if they *are* important, can it be right to leave such important matters to chance? (1998b, 29)

Harris' is suggesting that it does not matter whether a trait such as hair colour is important—if such traits are important, they should not be left to chance and if they are not important, they do not deserve protection. However, it does matter whether or not a trait is important. A trait might be important because it indicates the degree of moral status possessed and the greater moral status possessed the more protection that being is entitled to. What is distinctive about the examples given by Harris is that they are unimportant with regard to the possession of moral status. However, despite being unimportant in this sense, such traits might be important in determining our moral obligations when the likely social consequences of permitting their manipulation are taken into account. It might be the case, for example, that some traits are more important to the values held by parents or society, so that allowing influence of those traits will be more likely to encourage rights-violating fashions.

There is a third reason to question or limit the intuition distinguishing prenatal genetic manipulation of disabling diseases/conditions from manipulation of non-disabling or non-disease conditions. The idea that classifying a trait or condition as a disability or disease is value neutral is

²⁴ The line that I defended in 6.2.2 is capable of being interpreted as supporting aspects of this claim. However, if interpreted in this way the terms "treatment" and "enhancement" are not appropriate labels for distinguishing between the permissible and impermissible.

misguided. When such classification determines the regulatory or attitudinal response to a trait or condition, it is inescapably moral (as opposed to non-moral). The distinction between a disease and non-disease requires a standard of normality, deviation from which is to be labelled disease. This standard can track any number of models, including the typical function of the majority of people, the desires of parents, and the ideal function of a person in a specific environment. However, the distinction between the permissible and impermissible cannot legitimately rest on these particular examples. What is important, under the *PGC*, is not the relationship between a specific variant of a trait and, say, the variant of this trait held by the general population. What is important is the effect that this trait has, or is likely to have, on the agency behaviour and generic capacities of the prospective child possessing the trait and other persons potentially effected by that child having that trait.

In sum, any defensible distinction between permissible treatment and impermissible enhancement, will usually apply to both prenatal and postnatal manipulation, cannot rest on purportedly value-neutral definitions of disease, and must not be blind to relevant variables in multivariable conflicts.

6.4.2 Prenatal Treatment/Enhancement and the Child's Right to an Open Future

The oft-cited distinction between treatment and enhancement masks other claims. What is often really in issue is the potential conflict between the claims and desires of prospective parents, and the claims and potential desires of their prospective children. In another context, Feinberg (1980) discusses a further potential conflict between the parent's "right" to control their child's upbringing (the right to "bend the twig"), and the child's right to retain the capacity to pursue certain future purposes, what he calls the child's "right to an open future." According to Feinberg, children have a right to an open future, encompassing numerous "rights-in-trust" or "anticipatory autonomy rights" that seek to protect the interests that the child might come to have later in life. According to Feinberg these rights can be violated now if the ability of the child to exercise them, when it becomes an adult, is removed or hindered now.

Unfortunately, Feinberg does not explicitly ground his right to an open future. It is possible to read his argument as presenting the right as (i) a possible right that is capable of being possessed by children, (ii) a right derived from the assumption that the adult that the child will (or is intended to) become has autonomy rights, or (iii) a merely asserted, ungrounded claim. The *PGC* does, however, ground such a right. Under the *PGC*, the subject of prenatal influence is granted moral protection because of the

possible agent that it is, and because of the more probable agent that it will become (i.e., it will usually become, or be intended to become, an ostensible agent in the future). These rights/protections seek to protect and develop, *inter alia*, the necessary conditions of their pursuing future purposes with general chances of success (additive rights).²⁵ Thus, the only future purposes that can be legitimately closed off are those that would impose undue burdens on any potential duty holder, or involve the violation of the rights/protections of others.²⁶ Moreover, since the *PGC* protects future rights over and above additive rights, it also follows that the *PGC* recognises a *prima facie* right to an open future that is wider than Feinberg's and is not dependent upon birth as a trigger. Since this right will impose obligations on others, including prospective parents, it follows that prospective parents primarily have obligations towards, rather than rights over, their children. Indeed, prospective parents have rights to restrict the range of future choices open to their children only insofar as necessary to protect those generic features of their own or others that are hierarchically more important. Therefore, the ambit of the right to an open future presents itself as a relevant factor in delineating permissible from impermissible prenatal influence as explored in 6.4.1.

In some cases, where the *PGC* derived claims of prenatal subjects are unclear, there will be a range of decisions that may be left to constrained parental discretion. Nonetheless, parents are under a *prima facie* obligation to maximise the range of future purposes open to their child. That is not to say that prospective parents are under a duty to conceive and rear those prospective children with the greatest potential for future purpose fulfilment, rather they must seek to maximise the potential for future purpose fulfilment possessed by their existing offspring, including prenatal offspring.

This means that prenatal influence of traits is not inherently problematic where the aim is to increase the potential for future purposivity of an existing subject, at least where this aim is likely to be achieved without creating a disproportionate risk of inadvertently putting the subject in a worse position than it would otherwise be in. This applies to techniques of prenatal influence ranging from prenatal administration of vitamins to prenatal gene therapy.

In contrast, using prenatal influence to reduce the potential for purpose fulfilment is morally problematic. Thus, all things being equal, it is impermissible to attempt to modify an embryo so that the child born will be

²⁵ For an explanation and defence of these claims, see Chapters One and Two, especially 2.7.

²⁶ An ostensible agent can also close off a future purpose by choosing to waive the benefit of its right to pursue it. Obviously this does not apply to a prenatal subject who, even on the assumption that it is a locked-in agent, cannot display a choice to waive the benefit of a right.

congenitally deaf (perhaps, to render it more amenable to the deaf culture of its deaf parents), or have achondroplasia (perhaps, to enable it to fit into the spatially restricted living conditions of parents with such congenital dwarfism). Both traits are associated with limitations on the range of future purposes open to the child. The deaf have less communicative and interactional potential than those with full hearing. Achondroplasia carries purpose-restricting effects, such as a below average life expectancy. Therefore, inflicting these conditions on a child who could have been born without them would harm the generic features of that child.

It might be countered that Deafness and Achondroplasia²⁷ are to be viewed as cultural identities, rather than as disabilities.²⁸ There are, however, at least two problems with such a counter argument. First, it is *prima facie* inconsistent with the right to an open future to bring a child up within a culture that will limit the child's options to move outside that culture at some future point.²⁹ Second, if those with full hearing (or without achondroplasia) are held to lack the potential to be integrated into the relevant culture, on the basis that a qualificatory requirement of this culture is deafness /achondroplasia, then this culture is excluding people because they do not possess a trait or property that is irrelevant to the possession of intrinsic moral status. In other words, such cultural values involve treating those excluded agents as if they had less value, and exclusionary values of this sort are *prima facie* illegitimate. Deafness or any other trait-based culture must not become the new racism. That is not to say, however, that defensible reasons for choosing a deaf or achondroplastic child over those without such conditions can never be offered. As always, it is a matter of avoiding violating the generic rights of agents. There are, for example, limits on the ability of any prospective parent to raise a child without instilling or perpetuating some form of prejudice. Such limits are often created by the existence of cultural and practical contingencies, which are relevant to (*inter alia*) the generic rights of the parents.

The "right to an open future" is, therefore, a convenient label for a *prima facie* presumption derived from the PGC. This is a presumption in favour of permitting prenatal influence of those traits associated with future purposivity; at least where the technique used does not involve the destruction of rejected prenatal subjects and does not carry disproportionate risks for the subject. This presumption needs to be carefully specified. The future purposivity in question is to be defined in terms of potentially

²⁷ Following Davis 1997b, I have used upper case for the first letter to emphasis the use of the term to denote cultural identity.

²⁸ On Deafness is a culture, see Ivers 1995. See also Davis 1997b, 567–575.

²⁹ A similar argument is made in relation to Deafness in Davis 1997b, 575. Unfortunately, Davis grounds the right to an open future in the contingent values of genetic counsellors, rather than a defended moral theory.

displayed generic features, rather than the contingent values of a specific society. In a world where sight is relevant to one's *specific task competence*—i.e., one's ability to pursue certain purposes without unintentionally putting oneself or others at risk of harm—and having green eyes is not, having green eyes will not be relevant to one's future purposivity.³⁰ This is because the purpose-restriction caused by the illegitimate prejudices of others (against those having green eyes) cannot be condoned. It follows that, in this example, the presumption would be in favour of prenatal influence realistically aimed at giving a prenatal entity sight, but against prenatal influence aimed at ensuring that the prospective child will have blue eyes.

Moreover, this presumption—the right to an open future—does not apply to techniques of prenatal influence such as PGD and PND, as these involve the rejection or destruction of possible agents. Thus, more complexities are raised by a parental desire to use prenatal testing to ensure that the child that is implanted or carried to term has a trait or condition that is irrelevant to its moral status but will restrict its future purposes. If they choose to implant or continue gestating a child with a gene or genes associated with congenital deafness, achondroplasia, or blue eyes, rather than one without this gene or genes, the chosen child is not thereby harmed. However, others are potentially harmed by such a choice. I have already addressed the possibility that widespread trait selection for traits that are irrelevant to moral status could encourage or display prejudice towards others with the rejected traits or their families (in 6.2.2). Moreover, the subjects of prenatal testing that are rejected, by either non-implantation or abortion, are harmed. They are judged not worthy of implantation or gestation on the basis of traits they possess that are irrelevant to their moral worth. Nonetheless, the birth of a child with such a trait might impose considerable burdens on those

- (a) whose contingent desires and expectations are frustrated by that trait;
- (b) who live in a society that provides little support to those who would rather give such a child up for adoption than rear it themselves; and
- (c) whose society offers insufficient postnatal support.

Thus, to take one example, parental attempts to avoid the birth of a child with PKU, whose symptoms are avoidable with a special diet, have less weight in countries providing financial support for parents of such children (such as the UK), than in countries that do not (such as the US).³¹

³⁰ The concept of specific task competence, and the related concept of societal competence, were first explained and examined in Beylveled and Pattinson 1998.

³¹ The British Medical Association (BMA) states that "in the UK financial assistance is available for those requiring a special diet to avoid phenylketonuria" (1998, 115).

6.5 Resource Allocation

Since it is highly unlikely that universal access to the techniques of prenatal influence will ever be feasible, the techniques raise access and resource allocation issues. There are a number of sub-issues here. First, there is the negative (non-interference) versus positive (assistance) rights issue. Although the *PGC* grants both negative and positive rights, the positive rights are much more limited (i.e., the comparable cost and own unaided effort provisos: 2.7). In practice, the demands on public-funded medical services mean that the techniques of prenatal influence will rarely be given priority for research allocation. There are exceptions to this. For example, in the UK nearly all prenatal screening and diagnosis is undertaken within the National Health Service (see ACGT 2000, 18). Under the *PGC*, resource allocation should track generic needs and, so, many limitations on public funding will be defensible. Second, even for those who can afford to pay for access to the techniques there still remains an issue of whether access should be subject to further access criteria. Access to assisted reproduction is, for example, routinely subject to questionable eligibility criteria in many EU countries (see Beylveland and Pattinson 2000b, 216–223).

The resource allocation issues are particularly pertinent where the resource could alter the nature of society, as is the case here. The genetic and reproductive technologies that form the focus of prenatal influence are usually very expensive and not realistically available within most developing countries. It has been argued that the biggest killers are not usually the direct result of genetic disease: cancer and heart disease in developed countries, and infections in developing countries (see Greenwell 1997, 224). While this claim has a point—the techniques of prenatal influence are often not a medical priority—it must be kept in mind that all of these conditions have a degree of contributory genetic input. For example, some cancers and infections have been associated with specific contributory genes and might be reduced by prenatal manipulation by, for example, successful gene therapy.

There is also an argument for restricting access to the techniques of prenatal influence suggested by resource limitations. Often presented as an empirical slippery slope argument, it can be argued that since access to the techniques will only realistically be available to the rich and successful and the techniques offer the potential to increase the prospects of one's offspring, unrestricted access is likely to mirror, increase, and perpetuate societal inequalities. Some go much further and argue that the ultimate consequence is likely to be a division of what is now human society into sub-species due to genetic modification of one group so that they become unable and unwilling to reproduce with the genetically disadvantaged (see, e.g., Silver 1998, 1–13; 281–286).

The plausibility of this claim raises wider issues. The potential for the financially and socially advantaged to use their position to increase the opportunities and abilities of their offspring is not something that is restricted to the techniques of prenatal influence. Wealthy parents can, for example, afford to pay for their children to have additional or privately funded education and medical care. Directly preventing parents from using their legitimately acquired economic resources for what are *prima facie* morally permissible purposes is not easy to reconcile with the *PGC*. The existence of social inequality *per se* does not violate the generic rights of others. Social inequality is only an immoral outcome where it is the result of immoral behaviour or institutions, i.e., those creating or maintaining violations of generic rights. Thus, if the disposable expenditure of the wealthy is limited to the extent permissible after appropriate satisfaction of the hierarchically more important claims of others, then the potential of any remaining inequality of resources to provide advantages for some children is not, generally, morally relevant. There are exceptions to this generalisation, as the hierarchically more important claims of others, including the prospective child, do mean that well off parents cannot do as they wish. For example, all things being equal, any traits that put biological barriers in the way of future reproductive options cannot be permitted, especially if this were likely to result in the separation of humans into sub-species. Given the history of conflicts between different populations of humans, any species differentiation between humans is very likely to lead to prejudice, unjustified discrimination, social segregation, and possibly war. Also, as argued above (6.2.2), the techniques of prenatal influence must not be used to perpetuate prejudice against traits that are irrelevant to the possession of intrinsic moral status.

6.6 Conclusion

One theme running throughout this and the last few chapters is that, irrespective of the specific goal, we must distinguish between prenatal influence by

- (i) manipulating subjects to ensure desired traits (using, e.g., prenatal gene therapy); and
- (ii) selecting subjects with desired traits (using, e.g., PGD).

Action (i) is capable of harming the prenatal subject now or in the future (including its right to an open future). Any prenatal manipulation that puts the subject in a worse position vis-à-vis its possession of the generic features than it would have been in had it not been manipulated, has harmed it. Thus, the only remaining issue is whether this harm is justified.

In contrast, action (ii) cannot harm the chosen subject, because it cannot be assumed that the subject has been denied a better alternative existence (see 5.2.1). Where, however, action (ii) is contingently characterised by an attitude or intention that will be harmful to the selected subject in the future (i.e., an intention to act inconsistently with its rights as an agent-in-future), then the action can still be immoral. But, since selection *per se* cannot harm the selected subject, no matter how bad its traits or prospects, the selection as such cannot violate the subject's rights. This might seem an unduly fine distinction, but the point is that no generic harm is inflicted unless the alleged victim could have been in a state of less or non-harm vis-à-vis its possession of the generic features *at the time of the alleged harm*.

This chapter has explored many more specific arguments.

Slippery slope arguments are often invoked to decry the developing genetic and reproductive technologies, usually without adequate defence of the conditions that they must satisfy if such arguments are to be sound. I have suggested that these arguments must be better specified and defended than they usually are. For example, those presenting predictive claims require supportive empirical evidence. Also, it seems to be too commonly assumed that there is no need to prove that the allegedly unacceptable outcome—usually called genetic enhancement—is indeed morally unacceptable. This might well be the case but it should not be assumed, especially given the doubts about this conclusion raised in 6.4.1.

I have held up one empirical slippery slope argument as having a great deal of force (see 6.2.2). It was argued that since influencing certain traits is (on empirical grounds) likely to lead to harm to those with the rejected traits, those without the chosen traits, or the families of such persons, it is *prima facie* impermissible to

- (a) select a prenatal entity for traits that are irrelevant to the possession of moral status; and
- (b) manipulate a prenatal entity for traits that are irrelevant to the possession of moral status and non-harmful to the subject (i.e., irrelevant to its future purposivity).

Thus, all things being equal, this argument justifies starting from the presumption that prenatal influence of such traits is to be restrictively regulated to limit encouragement and exercise of illegitimate prejudices. Furthermore, this presumption might be strengthened as a presumption against sex selection for social reasons by arguments presented in 6.2.3, on that basis that such actions are likely to engender and encourage illegitimate sexual stereotypes.

I have also argued that, like the rhetorical slippery slope argument, the rhetorical human dignity argument is to be rejected as having no place in a rational debate. Determining whether the concept of human dignity consistent with the *PGC* has been contravened is, however, no simple task. It

involves all the complexities inherent in trying to apply the *PGC* to multi-variable conflicts. These complexities that have led me to rely on *prima facie* presumptions, rather than absolute conclusions on controversial applications of the *PGC*.

The next chapter, as the final chapter, will draw together the presumptions defended in this book, and return to examine the regulatory mechanisms adopted in the UK and other EU countries, Canada, and the US.

Chapter 7

Conclusion

The media periodically evokes the image of a brave new world of designer babies. In the broadsheets, recent headlines include: “‘Designer Babies’ raise the spectre of genetic manipulation;” “Deaf parents could choose to have deaf children”; and “Gay groups split over ‘engineered babies’.”¹ This book has taken an unavoidably theoretical approach to the issues behind these headlines. It has explored the implications of a specific moral theory for the techniques and goal of prenatal influence. That there are no morally neutral opt-outs hardly needs mentioning; the decision not to regulate is clearly as much a decision in need of justification as the decision to regulate.

The techniques of prenatal influence have raised complex issues concerned with the selection and design of children, the desires and expectations of parents, and the rights of other potentially affected family or society members. Most of the conclusions reached on these issues have taken the form of tentative and provisional presumptions, rather than definitive conclusions. In Chapters Two and Four in particular, I emphasised the complexity inherent in applying the *PGC* to multi-variable conflicts, and the need to rely on its indirect application through competent and good faith attempts to apply the *PGC* by those legitimately appointed to do so. Procedural solutions are not, however, the full story, as there remains a range of legitimate discretion outside of which no competent official could in good faith attempt to step.

The application of the *PGC* must take account of all relevant factors, including the nature of the social, scientific, and political reality. A first best scenario, an ideal world where supremely rational agents universally seek to uphold the *PGC* without problems of scarcity, will never be a realistic yardstick. A second best situation, a world governed by human ostensible agents predominantly attempting to apply the *PGC* constrained by a degree of scarcity, also appears to go far beyond reality. A third best scenario, a world where human ostensible agents often apply *PGC*-values in ignorance or denial of the *PGC* as the supreme principle of morality and faced with scarcity of many resources, is much closer to the Western world. In the main, the Western world probably falls within or just below a third best scenario. At least that is what I have assumed when evaluating the

¹ Ledward 2000, Connor 2000, and Laurence 2000, respectively. All of these headlines are from *The Independent*, which is not known for being melodramatic.

regulatory responses of the 17 countries studied. This seems to be a plausible assumption given the almost universal incredulity at the idea that there could be a supreme principle of morality, the coincidental fact that many of the values of the dominant Judaeo-Christian moral framework are similar to those of the PGC, and the evident limits on available natural and economic resources.

7.1 Summary of *Prima Facie* Presumptions

We are faced with the reality that many prospective parents are not happy to raise just any child. Many attach great importance to a child's traits or genetic origins. The techniques of prenatal influence, however, are more than just means of satisfying parental desires and expectations. These techniques also affect the interests of the subject (i.e., the gamete, embryo, or fetus) and persons who are neither subjects nor prospective parents. Faced with the complexities introduced by these potentially conflicting moral interests, this book has sought to defend a number of *prima facie* presumptions.

In Chapters Four and Five, presumptions were defended

- (a) in favour of early abortion where the pregnant woman does not at that time want to carry and give birth to any child and attempted to avoid getting pregnant (4.3);
- (b) against permitting any form of prenatal screening or testing (including PND or PGD) for incurable late onset disorders such as Huntington's disease (4.3.1);²
- (c) against using PGD to select an embryo for implantation that displays less evidence of agency than the other (non-implanted) embryos in the sample (4.4);³
- (d) in favour of using PGD over PND to achieve the same end (4.4);
- (e) in favour of early *in vitro* embryo research⁴ where it is necessary to protect the basic generic features of ostensible agents (4.5.1);
- (f) against a blanket 14 days limitation on *in vitro* embryo research (4.5.2);
- (g) against (non-therapeutic) research on the fetus, unless the fetus will (for other reasons) be disregarded (4.5.1);
- (h) in favour of permitting cloning where it presents the only means for an involuntarily childless agent to have a child, a carrier of a mitochondrial disease to have a child without the disease, or a person to avoid other undesired traits, and the denial of such an opportunity will cause generic harm to an ostensible agent (5.3.1); and

² This presumption is even stronger where the parents do not wish to know whether they themselves have the Huntington's mutation (4.3.1).

³ The morality of disregarding unimplanted embryos is also explored in 4.4.

⁴ Embryo research was distinguished from experimental treatment in 4.5.

- (i) against prenatal gene therapy until it becomes more predictable and less risky for the subject, unless the aim is to remove traits associated with non-viability or extremely low moral status (5.6.1 and 5.6.2).⁵

Many of these presumptions are conservative and of limited scope. We are not, after all, starting with a blank sheet nor is moral theory anything like mixing instant gravy granules. The presumptions do, however, provide some basis for questioning the current regulatory positions.

Despite their limited ambit, in some countries some of these presumptions would be very difficult to implement as regulatory policies. One only has to witness the slowness of legislative action to see the controversy that genetic and reproductive techniques can elicit. Belgium, Greece, Italy, and Portugal have, for example, had a series of unsuccessful proposed laws, and France is unlikely to revise its 1994 bioethics legislation (which was due to be revised in 1999) before 2002. The public or political will for change or a different type of compromise is often absent. For example, in none of the 17 countries studied is there much political or public support for formally permitting the creation of a cloned child or explicitly granting a regulatory body permission to do so in the future. Democratic institutions are constrained by the views of political representatives and the tide of public opinion. Public opinion is, however, subject to change and is capable of being changed. Nonetheless, we have seen that, at present, the regulatory approaches adopted in the EU countries, Canada, and the US display differing levels of compliance with these presumptions.⁶

Presumption (a) is clearly rejected by the Irish law, which appears to grant too much protection to the embryo-fetus. The other countries examined (in 4.3.2 and Appendix 1) appear to be generally compatible with this presumption. However, the position in many of these countries (notably the UK) requires more justificatory support than is provided by this simple presumption (see 4.3.2).

Presumption (b) is rarely explicitly upheld, as incurable late onset disorders are often not separated from other traits by formal regulatory responses. There are, however, many informal or non-statutory guidelines that do treat late onset disorders differently, and so the *de facto* position in some countries might uphold this presumption.

Building on this presumption (in 4.3.2), I argued that the legislative position on abortion following PND in countries such as Britain was *prima facie* too permissive. It was argued that granting less protection to one category of embryo-fetus—such as the “seriously handicapped”—is only appropriate where that category is defined relative to the possession of

⁵ Other presumptions defended in Chapters Four and Five are outlined below, having been given a more precise formulation in later chapters.

⁶ The following discussion draws on 4.3.2, 4.4.1, 4.5.2, 5.4, and 5.8, as well as Appendices 1 to 5.

(lower) moral status or where there is a conflict between those in this category and the hierarchically more important needs of the pregnant woman. In contrast to countries such as Britain and Finland, it was argued that the Italian abortion legislation is consistent with this presumption. (See Appendix 1 for the other countries.)

Presumption (c) requires little enforcement, as it is hard to imagine a situation where a prospective parent would choose to implant an embryo without the potential for ostensible agency over one with such potential. Nonetheless, this presumption appears to be implicitly supported by those countries that either prohibit PGD or limit its use to the avoidance of chromosomal and genetic abnormalities. Some of these regulatory responses are, of course, questionable for other reasons, including those underpinning the other presumptions defended in this book.

Presumption (d) is supported by those countries that have less restrictive regulation of PGD than of abortion following PND (see Appendix 1 and 2).⁷ Thus, the regulatory position in countries such as Austria and Germany is inconsistent with this presumption.

Presumption (e) is only upheld by those countries permitting *in vitro* embryo research, namely, Belgium, Canada, Denmark, Finland, Italy, the Netherlands, Portugal, Spain, Sweden, the UK, and the US. It is not upheld by the legislation of Austria or Germany, and arguably the French legislation (even though it permits embryo research) effectively rejects the approach of this presumption.

Presumption (f) is not upheld by any country permitting embryo research and, of course, it is not upheld by countries prohibiting embryo research. Socio-political factors might make the widespread policy of restricting embryo research to the first 14 days after fertilisation politically unalterable. In the long term, however, regulatory policies should aim to attach the permissibility of embryo research to the goal of the research, the likelihood of the research attaining that goal, and the availability of alternatives. It is not clear that a blanket 14 day cut off point is justifiable in the face of these considerations.

Presumption (g) appears to be upheld by all the countries examined. However, this question has not been given sufficient focus to determine whether this is in fact so.

Presumption (h) is theoretically rejected by all the countries whose legislation prohibits cloning (Austria, Denmark, Finland, France, Germany, Sweden, and the UK), and is likely to be rejected by many more in the near

⁷ It would appear that if the proposed federal legislation is enacted in Canada, the use of PGD for sex-selection would be more stringently regulated than the use of PND for the same end (see Appendices 1 and 2).

future.⁸ However, the legislation of countries such as Sweden was drafted in such a way that it has to be interpreted fairly loosely if it is to encompass the creation of a human child using the Dolly technique.

Presumption (i) does not appear to have been adopted in its entirety by any country. The majority of countries with legislation addressing germ-line gene therapy appear to unconditionally prohibit it. Some countries clearly come closer to adopting this presumption than others. For example, the Spanish and Finnish legislation at least permit some germ-line gene therapy in some circumstances where it might benefit the subject, albeit within restrictive limits. Thus, the Spanish and Finnish legislation appear capable of being interpreted or applied in accordance with this presumption.

Chapter Six addressed the goal of prenatal influence itself. One particular empirical slippery slope argument was defended (see 6.3.2). This argument claims that allowing prenatal influence of certain traits is likely to encourage or facilitate illegitimate prejudice towards individuals, and relatives of individuals, with those traits. Taking account of specified factors, I relied on this prediction to defend a presumption against allowing prenatal influence of traits that are irrelevant to possession of moral status and, in the case of prenatal modification, non-harmful to the subject. Since none of the countries studied directly address the goal of prenatal influence, this presumption is not currently supported. In theory, there are at least two ways to support it. One is to introduce this limitation into regulation addressing the individual techniques. So, for example, a (rebuttable) presumption could restrict PND and PGD to those traits that are relevant to the possession of moral status. However, this carries a high risk of leaving regulatory lacunae. Another way to apply this presumption is to introduce it in the form of a more general regulatory response.

Any such regulatory response must be rebuttable in specifiable circumstances. Throughout this book I have argued for an underlying presumption in favour of allowing the exercise of parental influence of traits where it seeks to avert basic generic harm to prospective parents.⁹ Where, for example, there is a high probability that any offspring produced by a couple will have a relentlessly painful life, severe psychological harm to the prospective parents is a very likely consequence. Thus, prenatal attempts to avoid the conception or birth of child with, say, Lesch-Nyhan syndrome, Dystrophic Epidermolysis Bullosa (EB),¹⁰ or spina bifida, might be sufficient

⁸ It is also rejected by other formal regulatory means in many other countries, see Appendix 4.

⁹ Especially where the trait in question limits the prenatal entity's moral status (such as anencephaly), see, e.g., 4.3.1.

¹⁰ EB is a disease whereby any contact with the skin of a sufferer is likely to cause large blisters that will burst leaving raw open skin and scars, usually causing death within the first six months of life (see Glover 1998, 56).

to rebut or escape the presumption outlined in the previous paragraph. The strongest cases are those where the prospective parents have already suffered the consequences of nursing a child with these conditions (or have the condition themselves), so that the birth of another such child is likely to result in self-blame, vicarious suffering, and irreparable psychological damage. In the end, it is a matter of weighing the likelihood that a given action or inaction will violate the generic rights of agents. As emphasised throughout, this is not a failsafe mathematical process, but appropriate regulatory bodies must give priority to avoiding the infliction of basic generic harm on ostensible agents.

In Chapter Six I also argued for a second presumption, conveniently summed up as the "right to an open future." This is a presumption in favour of permitting prenatal influence of those traits associated with future purposivity, where the technique used does not involve the destruction of rejected prenatal subjects and does not carry disproportionate risks for the subject.¹¹ Prenatal influence in such circumstances would be aimed at fulfilling our duties towards the prenatal subject now and in the future, or at least advancing their interests. As such, this presumption is not restricted to future additive rights.

7.2 Genetic and Reproductive Tourism

Given the limited ambit of the presumptions defended in this book, those legitimately appointed to introduce regulatory mechanisms have a degree of morally acceptable regulatory discretion. However, in the modern world regulatory inconsistencies between countries can lead to genetic and reproductive tourism. This has three dimensions.

First, those denied access to the developing genetic and reproductive technologies might simply go to a country where access will be permitted, either because there is greater availability or less restrictive regulation. Diane Blood, for example, was able to receive treatment in Belgium following the UK regulatory authority's refusal to allow her to undergo artificial insemination using her dead husband's sperm.¹²

¹¹ This presumption underpins arguments made elsewhere in this book. It underpins the claim that therapeutic embryo-fetal manipulation (as opposed to non-therapeutic embryo research) will be justifiable in certain circumstances (see 4.5). It also underpins the proviso of presumption (viii) above (defended in 5.6.1/2), i.e., the right to an open future might justify prenatal gene therapy if it were more predictable and less risky for the subject.

¹² There was an added twist in the Diane Blood case, as her claim that the UK regulatory authority's refusal to authorise the export of her husband's sperm infringed (what were) Articles 59 and 60 of the EC Treaty—granting EC citizens the right to receive medical treatment in another Member State—was upheld by the UK Court of

Second, those prevented from offering existing procedures could seek out a country whose regulatory structure is more permissive. For example, a UK doctor is reported to have set up a sex selection service, using PGD, in Riyadh, Saudi Arabia, having been denied permission to do so in the UK. His intention was to carry out treatment initially in Naples, Italy where regulations are less strict (see Fletcher 1997).

Third, if scientists and researchers are prevented from developing the technology in one country they could move to a country with less stringent regulations. Following the passing of a bill prohibiting cloning by the US House of Representatives, Advanced Cell declared that it would probably move to the UK to conduct research using embryonic stem cells (see Whitworth 2001).

These three dimensions can put economic pressure on countries to adopt a less stringent regulatory approach. There are, however, a number of responses and limitations to these concerns.

First, mechanisms for reducing the likelihood of these outcomes are available. Popular mechanisms for avoiding or limiting genetic and reproductive tourism include international agreements and conventions, and other forms of internationally agreed minimal standards. With regard to the idea that multinational companies will relocate to less stringently regulated countries, the disincentive affect of public opinion and commercial pressures should not be ignored. With technologies that elicit widespread public disapproval, such as cloning and germ-line gene therapy, relocation is likely to carry commercial risks. Therefore, effective publicity and campaigning can, in some situations, prevent some forms of genetic and reproductive tourism. Witness, for example, the effects of public opinion on the advertising and policies of international companies such as Nike and Shell.¹³

Second, such tourism is only a realistic consequence of major regulatory decisions affecting the feasibility of access to, or research on, the techniques. Many, less important, regulatory decisions are not likely to result in travel to other countries.

Third, for some regulatory decisions, such as whether to require minimal clinical standards for assisted reproduction clinics, the ability of persons to travel to other countries for access create pressure to increase the degree of regulatory stringency.

Appeal: *R v Human Fertilisation and Embryology Authority, ex parte Blood* [1999] Fam 151. The Court of Appeal went on to lay down circumstances where such infringement would be justifiable under the EC Treaty. Although the court's interpretation of European law has been heavily criticised (see, e.g., Morgan and Lee 1997), it remains possible that future denials of access to genetic and reproductive technology will lead to actions being brought under European law.

¹³ E.g., in 1997/1998 public pressure caused Shell Oil to reverse its decision on the disposal of Brent Spar, an old oil platform. Shell was forced to dismantle the platform on land, rather than dump it was sea.

Fourth, there are sometimes alternative ways of addressing the negative consequences of such tourism. For example, new or existing economic institutions might be able to influence developments—although this has limited potential (see Beyleveld and Pattinson 2001).

Fifth, there are moral reasons why reproductive and genetic tourism should be accepted as an unavoidable consequence of state sovereignty. If state sovereignty is defensible,¹⁴ the existence of inter-state regulatory differences is an unavoidable consequence that should not, in itself, lead to revision of one's own regulatory response. In other words, little moral weight should be attached to the fact that some states have more permissive regulation, *where all the relevant regulatory differences could plausibly be defended under the PGC*. Economic and national pressure to be a leader in the developing genetic and reproductive technologies, should not dictate regulatory policy.

Despite these limitations, where divergent regulatory responses towards the techniques of prenatal influence are likely to create an economic or prestige advantage for the permissive countries, this will make a slide towards permissivity just about inevitable. At least, for those techniques not attracting widespread condemnation, such as embryo research (see Beyleveld and Pattinson 2001). This tendency can be witnessed with regard to the regulation of research involving embryonic stem cells. Many countries, including France, are now considering passing legislation formally permitting such research.

All this demonstrates the need for both international and national regulatory oversight.¹⁵

7.3 Additional Considerations

The stringency of regulatory response is only one factor relevant to regulatory oversight of prenatal influence. Other factors, listed at the beginning of Chapter Four, include the form of regulatory response and its trigger. Formal legislation is not the only regulatory response available and, if legislation is to be effective, it must be supported by less formal mechanisms, such as cultural norms and professional support.

¹⁴ This is a pretty major "if," as (unless carefully specified) state sovereignty has the potential to undermine the universalist nature of the PGC. Nonetheless, even if state sovereignty is not, all things considered, consistent with the PGC, it must be recognised that it is likely to remain in practice.

¹⁵ On the creation of an international regulatory agency to deal with human cloning, see Greene 2001, especially 357–360. Many of the considerations raised by Greene are also relevant to other techniques of prenatal influence.

Although legislative responses are neither necessary nor sufficient, authoritative regulatory action or oversight is required. Authoritative application (or at least consideration) of the regulatory presumptions defended above is not compatible with unconstrained scientific and market freedom. In countries where the relevant technology is likely to be developed and applied to meet demand, non-regulation is not an option. Although regulatory oversight needs to attract public support to be effective, it must be the product of adequate consideration of all morally relevant interests and variables by those legitimately empowered to do so. In those countries where the government has failed to act—such as the US where there has been little federal regulatory intervention¹⁶ and only piecemeal state responses to the techniques of prenatal influence—the techniques have been left to private arrangements regulated only by voluntary agreements and self-regulatory initiatives. Both have well documented weakness. Deferment to private law mechanisms, such as the law of contract, is hindered by inequality of bargaining positions, failure to represent all morally relevant needs and interests, and the contingencies of enforcement. Similarly, self-regulation by researchers and clinicians cannot provide authoritative consideration of all morally relevant needs and interests. Effectiveness should not be confused with legitimacy; it is merely one condition of adequacy.

Authoritative blanket rules are also not the answer. Since the application of some of the provisional conclusions of this book depends on contingencies that are capable of changing faster than legislative responses, in many cases regulatory oversight is better left to legitimately appointed regulatory committees and bodies. All things being equal, if violations of the PGC are to be limited and avoided, many regulatory decisions must be made on a case-by-case basis, rather than subjected to blanket policies. In general, blanket prohibition or non-regulation of techniques such as cloning or prenatal gene therapy will not do. Nor is it acceptable to treat all attempts to achieve prenatal influence as equivalent. Thus, the presumption for regulatory oversight must be in favour of legitimately appointed regulatory bodies and sub-bodies, rather than formal blanket approaches. I, therefore, consider the UK's recent legislative ban on cloning (see 5.4) to be ill-conceived and driven by short-term political expediency. If the HFEA is not

¹⁶ Of the techniques of prenatal influence, cloning and gene therapy have attracted the greatest federal regulatory response. Both the Food and Drug Administration (FDA) and National Institutes of Health (NIH) claim some jurisdictional competence. However, the FDA's jurisdictional competence is limited to ensuring the safety and efficacy of biologics and medical devices, and the NIH only has jurisdiction over NIH-funded proposals and proposals taking place within NIH-funded institutions. See Appendices 4 and 5.

competent to make case-by-case decisions of this sort, then this is an argument for reforming the Authority.¹⁷

The membership and appointment procedures of committees, such as the HFEA, need to be transparent and balance the need for competence with the need for accountability. As stated earlier, whatever else a good faith attempt to apply the *PGC* requires, it requires officials to display a high degree of competence. The most effective way of ensuring the competence of committee members is to have stringent qualificatory criteria. In this regard, the UK legislation, the Human Fertilisation and Embryology Act 1990, is far from ideal.

Under UK legislation, the members of the regulatory Authority are appointed by the Secretary of State¹⁸ for no more than three years at a time.¹⁹ The Secretary must take into account the desirability of ensuring that the Authority's decisions "are informed by the views of both men and women."²⁰ Further, "at least one-third but fewer than half of the other members of the Authority," must fall into one of three specified categories of people who have had first-hand experience of using or keeping gametes or embryos outside the body.²¹ However, persons from these three categories cannot be appointed as chairperson or deputy chairperson.²² Thus, a government Minister, who is, in theory,²³ accountable to the electorate, decides the membership of the Authority without being required to ensure their competence in moral theory. The result is a regulatory body whose members might comprise persons who do not have competence in moral theory and have no direct democratic support for their role in making ethical decisions. This is far from satisfactory.

Additionally, if all *PGC*-relevant issues are to be addressed, regulatory oversight should not only be triggered by the use of specific techniques, but also by attempts to achieve the goal of prenatal influence by other means. A related point, following from the arguments of this book, is that the regulation of the genetic and reproductive techniques, and the purposes for which they can be used, cannot take place in a regulatory vacuum. In many cases the illegitimate purposes and values being displayed by some potential uses and users of these techniques are better addressed at their source, which often has little to do with the techniques or goal of prenatal influence. Just as racism manifested in the employment context is often more effectively

¹⁷ Granting greater regulatory functions to the HFEA would also address other problems left unaddressed by the legislative ban on cloning, see 5.4.

¹⁸ 5(2)(b) and Sch. 1, para. 4(1), Human Fertilisation and Embryology Act 1990.

¹⁹ Sch. 1, para. 5(2).

²⁰ Sch. 1, para. 4(2).

²¹ Sch. 1, para. 4(4). These persons are specified in para. 4(3).

²² Sch. 1, para. 4(3).

²³ Whether the current parliamentary system is a legitimate attempt at representative democracy is beyond the scope of our present concerns.

addressed by means other than, or in addition to, employment legislation, *PGC*-violating behaviour is often better addressed at a social level by mechanisms such as education.

In conclusion, the techniques and goal of prenatal influence present yet another battleground for conflict between the rights and protections granted to different possible agents. Many of the issues raised by these techniques are not exclusively confined to these techniques. As I have emphasised throughout, resolving multi-variable conflicts should be the prime concern and many of the ethical and regulatory problems can be raised in the absence of the possibilities presented by the developing genetic and reproductive technologies. Although this book does not provide a comprehensive regulatory policy, it has tried to provide some ethical guidance. One clear piece of guidance is that neither law nor moral theory can provide neat substantive solutions to all the moral questions raised by attempts to influence traits before birth.

Appendix 1

The Legality of Prenatal Diagnosis (PND) and Abortion¹

<i>Country</i>	<i>Legislation</i>	<i>Legality of Abortion</i>
Austria	Ss. 96, 97 & 98 of the Penal Code ²	Permitted <ul style="list-style-type: none"> (a) within 12 weeks after conception; (b) to avert a serious danger to the mother's life or (physical or mental) health; (c) where there is a "serious danger" that the child will be afflicted with a "serious" (mental or physical) defect;³ or (d) if the mother was underage at the time of conception (s. 97).
Belgium	Law of 3 April 1990 (amending the Penal Code) ⁴	Permitted <ul style="list-style-type: none"> (a) before 12 weeks, after counselling, where a doctor is convinced of the pregnant woman's distress and determination; and (b) up to birth, if the pregnancy would "gravely endanger" the health of the pregnant woman, or if, were the child born, it would have a serious and incurable disease. (Penal Code, s. 350.)

No time limit is provided for abortions after 12 weeks performed on the grounds specified in (b) above. However, during the parliamentary discussion the majority stressed that abortion is the ending of pregnancy where the fetus is non-viable. If the fetus is

¹ An early version of this table originally appeared in Beyleveld and Pattinson 2000b. It has been modified, expanded, and corrected.

² An English translation of these sections of the Penal Code can be found at <http://cyber.law.harvard.edu/population/abortion/Austria.abo.htm>.

³ Mandry 1998, 34 translates this as where "the child will probably be severely handicapped."

⁴ For an English translation see International Digest of Health Legislation 1990.

viable, its destruction was regarded as infanticide.⁵ At present, there is no jurisprudence on late term abortions where the fetus is viable.

For all abortions, the physician is required to inform the woman of the risks of the termination, draw her attention to the possibilities for taking care of the child if it were born, and be convinced of her determination to terminate (s. 350(2)).

Canada Charter of Rights & Freedoms

A majority of the Supreme Court struck down s. 251 of the Federal Criminal Code, which vested control of abortion in hospital abortion committees, holding that it violated the security and liberty of the pregnant woman as protected by Art. 7 of the Canadian Charter of Rights and Freedom.⁶

The Supreme Court has so far managed to avoid determining whether the fetus is given protection under Art. 7.⁷

Proposed legislation exists: Assisted Human Reproduction Act

There have been a number of failed bills,⁸ including Bill C-47 which (in s. 4(1)(i)) prohibited the use of any diagnostic procedure for the purpose of ascertaining the sex of a zygote, embryo, or fetus, except for reasons related to its health.

In May 2001, the federal government released a *Proposal for Legislation Governing Assisted Human*

⁵ Information provided by Herman Nys.

⁶ *R v Morgentaler* [1988] 1 SCR 30. Health law is not of federal jurisdiction.

⁷ In *Borowski v Canada (Attorney-General)* [1989] 1 SCR 342, holding that the plaintiff lacked standing, and in *Tremblay v Daigle* [1989] 2 SCR 530, holding that the Charter was intended to limit government action and did not apply to disputes between private individuals.

⁸ Bill C-47 "Human Reproductive and Genetic Technologies Act" 1996 and a private members bill, Bill C-247 "An Act to amend the Criminal Code (Genetic Manipulation)" 1997. These took different approaches to the issue of federal jurisdiction by invoking different constitutional mechanisms. Bill C-47 uses the Peace, Order, and Good Government "POG" provision, which is almost a miscellaneous jurisdictional category, whereas the private members bill uses the federal government's criminal jurisdiction. It has been argued that the "criminal law is probably the most secure" from constitutional challenge (Caulfield *et al.* 1997, 4).

Reproduction.⁹ This proposal has been distributed in draft for discussion with the intention that the final version will be presented in 2002.

Although the proposed legislation does prohibit some forms of sex-selection for social reasons, it is only concerned with acts designed to ensure or increase the probability that an embryo will be a particular sex (s. 3(1)(h)).

An embryo is defined as "a human organism during the first 56 days of its development following fertilisation or creation, excluding any time in which its development has been suspended" (s. 2).

Thus, the proposed legislation does not appear to address diagnosis of an embryo or fetus over 56 days after its fertilisation or creation.

Denmark

Law No. 350 of 13 June 1973¹⁰

Permitted

- (a) on demand (and for free) within the first 12 weeks;
- (b) after 12 weeks, where there are serious social reasons, the case was rape or incest, or where the child is in danger of hereditary problems or sickness during the embryonic stage; and
- (c) up to birth, if necessary to avert a risk to the woman's life or a serious deterioration of her (mental or physical) health (Chapter 1).¹²

Research on PND: Law No. 499 of 12 June 1996¹¹

Clinical use: Regulated by administrative guidelines¹⁴

PND is permitted for women over 35 years and women with a risk of hereditary diseases.¹³

⁹ See Health Canada 2001a. For discussion of this proposed legislation, see Health Canada 2001b and Caulfield 2001.

¹⁰ An English translation can be found at <http://cyber.law.harvard.edu/population/abortion/Denmark.abo.htm>.

¹¹ Information provided by Nina Schultz-Lorentzen and *ibid.*

¹² See MacKellar 1997, 5; Nielsen 1997, 132; and Moulin 1996, 27.

¹³ See Rendtorff 1998, especially 83.

¹⁴ Information provided by Nina Schultz-Lorentzen.

Finland	Law No. 239 of 24 March 1970, as amended ¹⁵	Permitted
		(a) up to 16 weeks (s. 5). to avoid notable strain on the pregnant woman in relation to her living conditions and those of her family and other circumstances (s. 1(2)); if the pregnancy was caused by rape or other specified crime (s. 1(3)); if there is a reason to assume that the child would be "mentally retarded," or would have or develop a "severe disease or physical defect" (ss. 1(5) & 6(3)); or if the parents are severely limited in their ability to care for the child (s. 1(6));
France	Law 75-17 of 17 January 1975	(b) between 16 and 20 weeks, subject to the permission of the National Board of Health (s. 5); and
	Law 79-1204 of 31 Dec. 1979 ¹⁷	(c) up to birth, where the woman's life or health is endangered (s. 1(1) & 5).
	Law 93-121 of 27 Jan. 1993	
	Law 94-654 of 29 July 1994 ¹⁸	
	(Forming part of the Public Health Code, Art. L. 162-	PND procedures—defined to include medical practices the aims of which are to diagnose very serious disease of the embryo or fetus <i>in utero</i> —must be preceded by medical "genetic" counselling.

¹⁵ Amended by Law No. 18 of 1971, No. 564 of 1978, No. 572 of 1985, and No. 1085 of 1995. Act translated by Urho Kekkonen (Minister for Social Affairs and Health, Finland). See also <http://cyber.law.harvard.edu/population/abortion/Finland.abo.htm>.

¹⁶ Until recently it was the 10th week: see CCNE 2000 and BBC 2001.

¹⁷ An English translation of 75-17 and 79-1204 can be found at <http://cyber.law.harvard.edu/population/abortion/France.abo.htm>. Additional information provided by Pierre Langeron.

¹⁸ For an English translation see Bulletin of Medical Ethics 1994.

1 to 22)¹⁹ fulfilling certain stated aims (Art. L. 162-16).

With regard to PND, the National Consultative Ethics Committee (CCNE) has recommended that the word "genetic" be replaced with the word "specialised," since doctors in addition to geneticists may be called upon to conduct the session.²⁰

Germany	S.218 of the Penal Code ²¹	Termination of pregnancy by a physician is not illegal
		(a) up to the first 12 weeks, where the woman has had counselling not later than 3 days before the termination (s. 218a(1)); or
		(b) up to birth, where it is necessary to prevent a threat to the woman's life or a threat of "serious injury to her physical or mental health," which could not reasonably be averted by any other means (s. 218a(2)). In practice, the risk of mental injury to the woman is interpreted to encompass abortion following PND, the emphasis being placed on the pregnant woman rather than the fetus. ²²

The pregnant woman is not punishable under s. 218 if an abortion is performed by a physician under 22 weeks, where the woman has received counselling prior to the abortion (s. 218a(4)). Also, under this provision the court can refrain from convicting a pregnant woman who was experiencing a "state of particular distress" at the time of the abortion.

¹⁹ Information provided by Pierre Langeron. There are also other decrees addressing PND and other laws also mention abortion, e.g., Law of December 31 1982 allows the repayment of abortion expenses by the French national health service.

²⁰ See CCNE 1998.

²¹ For an English translation see International Digest of Health Legislation 1992.

²² Under the previous law, abortion was permitted for medical indications including hereditary disease. This provision was removed because it was thought to have "eugenic" implications. (Information obtained from Eser 2001, para. 37, 1761-1762; and Sabine Michalowski.)

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|--------|--|--|
| Greece | Law 1609/1986 on Abortion ²³
Ministerial decision A3B/oik 2799/25.2.87 | <p>Permitted where</p> <ul style="list-style-type: none"> (a) the embryo is less than 12 weeks old; (b) there are indications, based on PND, that the child will suffer from a serious abnormality and the pregnancy has not passed the 24th week of gestation; (c) the life of the pregnant woman is endangered or there is a danger of serious damage to her physical or mental health; or (d) the pregnancy is the result of rape or incest.²⁵ |
|--------|--|--|

The abortion must be performed with the consent of the woman by an obstetrician with the participation of an anaesthesiologist in an organised medical unit. If the woman is underage, the consent of one of the parents or her guardian is required.²⁶

PND must take place in a state, university, or armed forces hospital.²⁷

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|---------|---|---|
| Ireland | Offences Against the Person Act 1861, ss. 58 & 59, and the Eighth Amendment to the Constitution (Art. 40.3.3) | <p>S. 58 of the Offences Against the Person Act renders it an offence for a pregnant woman to "unlawfully" attempt to "procure her own miscarriage" and for anyone else to attempt to do so. S. 59 renders it an offence to supply or procure anything known to be intended for such a purpose.</p> <p>The Eighth Amendment states,</p> <p>"The State acknowledges the right to life of the unborn and, with due regard to the equal right to life of the mother, guarantees in its laws to respect, and, as far as practicable, by its laws to defend and vindicate that right."</p> |
|---------|---|---|

The Supreme Court has interpreted this provision as

²³ See Dalla-Vorgia 1988, 4; and European Commission 1995.

²⁴ Decision No. 2 of the 23rd plenary meeting of the Central Council of Health in 1985 defines the personnel of the Units that can conduct PND. See Dalla-Vorgia 1988, 3.

²⁵ See European Commission 1995; and MacKellar 1997, 15. An English translation of the legislation is also available at <http://cyber.law.harvard.edu/population/abortion/Greece.abo.htm>.

²⁶ Information provided by Panagiota Dalla-Vorgia.

²⁷ See Dalla-Vorgia 1988, 4.

prohibiting abortion, unless "there is a real and substantial threat to the life, as distinct from the health, of the mother."²⁸ This was held to include the risk of suicide, so that, on the facts, a 14-year-old girl was permitted to travel to England for an abortion.

An amendment to the constitution is under consideration²⁹

The proposed amendment prohibits abortion, defined as "the intentional destruction by any means of an unborn human life after implantation in the womb of a woman" (s. 1(1) of the Bill). However, it does not include the ending of a human life, by a medical practitioner using a procedure that s/he believes to be "necessary to prevent a real and substantial risk of loss of the woman's life other than by self-destruction" (s. 1(2)). Thus, it is stricter than the present law, because it will prohibit termination arising from the threat of suicide.

The proposed amendment permits women to travel abroad for abortion services that are legally available in other jurisdictions, even where they are not legally available in Ireland (s. 4).

This proposed amendment will be put to the people in a referendum.³⁰

Italy
Law No. 194 of
22 May 1978³¹

Abortion on demand is available within the first 12 weeks and six days of pregnancy, after which abortion can only be requested where

- (a) the continuation of the pregnancy or delivery could pose a serious threat to the woman's life;
- (b) the fetus has malformations so serious that the woman's psychological or physical well-being is endangered, or if her well-being is endangered by other pathological processes; or

²⁸ *Attorney General v X* [1992] 1 IR 1, 53-54, per Finlay CJ.

²⁹ Twenty-fifth Amendment to the Constitution (Protection of Human Life in Pregnancy) Bill 2001. See the Irish Department of Health Website: <http://www.doh.ie/pdfdocs/proporot.pdf>.

³⁰ Explanatory memorandum (<http://www.doh.ie/pdfdocs/proporot.pdf>).

³¹ Information provided by Roberto Mordacci. An English translation can be found at <http://cyber.law.harvard.edu/population/abortion/Italy.abo.htm>.

- (c) the pregnancy is the result of rape.³²

Luxembourg Law of 1978

Permitted

- (a) before 12 weeks, if the pregnancy would threaten the woman's physical and mental health, is the result of rape, or if there is a substantial risk that the child, if it were born, would be very sick or be physically or mentally seriously handicapped; and
- (b) after 12 weeks, only if two medical doctors ascertain that birth of the child presents a serious risk to the health of the pregnant woman or the child to be born.³³

Netherlands Law of 1 May 1981³⁴

Permitted up to fetal viability, if the woman is in a state of distress and has a genuine desire to terminate (ss. 5 & 20). In practice, this means that abortion is available on demand up to 24 weeks gestation.

Except in cases of imminent danger to the woman's life or health, the pregnancy cannot be terminated earlier than the sixth day after consulting the physician (ss. 3 & 16(2)).

The abortion must be performed by a physician in a licensed hospital or clinic (s. 2).

Where the fetus is viable, abortion is not generally permitted. Art. 82a of the Penal Code states that "take someone's life" includes "taking the life of a foetus that in reason can be expected to have the ability to keep alive outside its mother's body." The general defences to homicide apply. The legal position on termination for fetal abnormality is, therefore, restrictive but uncertain. Nonetheless, in practice, late

termination for severe fetal abnormalities is sometimes performed, albeit very infrequently.³⁵

Portugal

Chapter II of the Penal Code³⁶

Permitted

- (a) within 12 weeks, if it is necessary to remove the danger of death or serious and irreversible damage to the women's physical or mental health;
- (b) up to 16 weeks, if the pregnancy is the result of crime against "sexual freedom and self-determination;"
- (c) up to 24 weeks, if there are strong medical reasons indicating that the unborn child has a serious incurable disease or congenital defect;
- (d) up to birth if the fetus is unviable; and
- (e) up to birth, if it is "the only means of removing [the] risk of death or serious and irreversible damage" to the pregnant woman's body or physical or mental health (Art. 142, no. 1 of the Penal Code).

Also,

- (a) the physician who approves the abortion cannot perform it (Art. 142, no. 2); and
- (b) with a few specified exceptions, the written consent of the woman is required three days prior to the intervention (Art. 142, no. 3, a)).

Constitution³⁷

Sex selection is not expressly prohibited. However, some constitutional protection is granted to embryos and fetuses under Art. 24 (the right to life),³⁸ and Art. 26, no. 3 states,

"The law shall guarantee the personal dignity and genetic identity of the human being, particularly in the creation, development and the use of technology and in scientific experimentation."

³² See *ibid.*; MacKellar 1997, 18; and Clerici *et al.* 1997, 45.

³³ See MacKellar 1997, 19.

³⁴ See Health Council of the Netherlands 1997, 50; and van Thiel 1996, 103. An English translation can be found at <http://cyber.law.harvard.edu/population/abortion/Nether.abo.htm>.

³⁵ All information derived from Braake 2000, especially 391 and 388, where the issue of abortion for fetal abnormality under the Dutch law is fully discussed.

³⁶ For an English translation see <http://www.lexmedicinae.org/por/direito1.html>. I am grateful to André Pereira and João Loureiro for their guidance on these provisions.

³⁷ I am relying on an English translation of the Constitution of the Portuguese Republic, http://www.parlamento.pt/leis/constituicao_ingles/crp_uk.htm. See Pereira 2001, 497.

³⁸ See Pereira 2001, 495.

More specifically, Art. 13 prohibits any form of discrimination against anyone by reason of their sex. Also, the general abortion provisions apply. Thus, abortion for the purpose of choosing the sex of the baby (except to avoid a serious X-linked condition) is unlawful.

Order 5411/97³⁹

Prenatal diagnosis is defined as "a set of procedures that are carried out to determine whether an embryo or foetus has or does not have a congenital abnormality" (Art. 1). There must be a "large probability" that a serious genetic disease will be detected, and the test should only be performed after genetic counselling (Art. 3). What counts as a serious genetic disease is not specified.⁴⁰

Spain

Art. 417bis of Law 9 of 5 July 1985 (part of the Penal Code)⁴¹

Permitted

- (a) during the first 12 weeks, if the pregnancy is the result of a previously declared rape;
- (b) during the first 22 weeks, if two specialists who are not performing the abortion diagnose a serious physical or mental/handicap; and
- (c) up to birth, to avoid a serious threat to the life or (physical or mental) health of the woman, if stated in a report submitted by a medical specialist who cannot be the physician performing or supervising the abortion.⁴²

If an abortion is performed where these conditions are not satisfied, the woman will not be prosecuted, but the person conducting the abortion may be (Art. 145 of the Penal Code).⁴³

Sweden

Abortion Act of 1974, as amended by the Law No. 66

Permitted

- (a) up to 18 weeks (unless, due to the woman's illness, abortion would seriously endanger her

of 18 May 1995⁴⁴

- life or health) (s. 1);
- (b) after 18 weeks,⁴⁵ if permission is granted by the National Board of Health and Welfare where there are special reasons for the abortion (s. 3). Permission will not be granted "if there is a reason to suppose that the embryo is viable" (s. 4).

There is no time limit if there is a serious danger to the woman's life or health. This is subject to the permission of the National Board of Health and Welfare where it can be obtained without danger to the woman (s. 6). This is not, however, a ground for abortion as such, because it might be possible to save the life of the fetus, and the fetus is normally viewed as a patient to be treated and saved.⁴⁶

UK
(excluding
Northern
Ireland)⁴⁷

Abortion Act 1967 (s. 1(1)), as inserted by s. 37 of the Human Fertilisation and Embryology Act 1990⁴⁸

Permitted

- (a) up to 24 weeks, where the continuation of the pregnancy will involve risk, greater than if the pregnancy were terminated, of injury to the (physical or mental health of) woman or her family; and
- (b) up to birth, to save the life of the woman, to avoid permanent injury to her physical or mental health, or to avoid the birth of a severely handicapped child.

⁴⁴ Translated in Ministry of Health and Social Affairs 1995, Appendix 1. For another English translation see International Digest of Health Legislation 1996.

⁴⁵ Note that,

It is established practice with the National Board of Health and Welfare for no abortions to be allowed after the expiry of the 22nd week, the one exception to this rule being if the foetus being so badly damaged as not to be viable, or if [there is a danger to the pregnant woman's life or health]. (Ministry of Health and Social Affairs 1995, 4).

⁴⁶ Information provided by Elisabeth Rynning.

⁴⁷ The UK legislation does not extend to Northern Ireland: s. 48 HFEA 1990 and s. 7(3) Abortion Act 1967. In Northern Ireland it is illegal to carry out abortion other than to save the life of the mother or to prevent serious damage to her physical or mental health: *R v Bourne* [1939] 1 KB 687.

⁴⁸ The Abortion Act (as amended) provides statutory immunity with regard to the offences otherwise committed under the Offences Against the Person Act 1861 and the Infant Life (Preservation) Act 1929.

³⁹ DR, II, 6-8-1997, see Pereira 2001, 496-497.

⁴⁰ See Pereira 2001, 496.

⁴¹ See Gabarrón and Ramos 1997, 68.

⁴² See Gabarrón and Ramos 1997, 68.

⁴³ See Gabarrón and Ramos 1997, 68.

US	Federal Constitution	In <i>Roe v Wade</i> ⁴⁹ the Supreme Court held that women have a constitutional right to abortion derived from the constitutional rights of liberty and privacy. It was held that the State could not restrict abortions during the first trimester. During the second trimester the State could, however, intervene to protect the health of the mother, and at the point of viability the State's interest in the fetus can justify restriction.
	Individual state laws	Later Supreme Court decisions have upheld restrictions on public funding for abortions, ⁵⁰ and struck down, then re-affirmed the part of the Roe ruling that held that the state's interest in human life only exists at viability. ⁵¹ Abortion (even late abortion) for fetal abnormalities is legal in about half the states, although many doctors refuse to perform it. ⁵²

⁴⁹ 410 US 113 (1973).

⁵⁰ See Petersen 1996, 93–94.

⁵¹ *Webster v Reproductive Health Services* 492 US 490 (1989); and *Planned Parenthood of Southeastern Pennsylvania v Casey* 120 L. ed. 2nd 674 (1992).

⁵² See Malinowski 1994, 1481.

Appendix 2

The Legality of Preimplantation Genetic Diagnosis (PGD)¹

Country	Legislation	Legality of PGD (in addition to the rules governing embryo research)
Austria	Act No. 275 of 1 July 1992	Implicitly forbidden, because under s. 9(1), gametes and unimplanted embryos ² are only permitted to be medically examined and treated to the extent necessary to establish a pregnancy. ³
Belgium	None ⁴	Permitted by default. A licence is required to establish a centre for genetics. ⁵
Canada	None	Permitted by default. A voluntary moratorium on sex selection for non-medical purposes has existed since July 1995. ⁶ Proposed legislation exists: Assisted Human Reproduction Act There have been a number of bills that failed or were dropped. In May 2001, the federal government released a <i>Proposal for Legislation Governing Assisted Human Reproduction</i> . ⁷ This proposal has been distributed in

¹ A version of this table originally appeared in Beylerveld and Pattinson 2000b.

² The legislation does not define "embryo" (see EGE 1998, para. 1.17).

³ Information provided by Hille Haker.

⁴ There is, however, a Higher Council on Human Genetics established under the Crown Order of 7 November 1973. Information provided by Paul Schotsmans.

⁵ Information provided by Paul Schotsmans.

⁶ See Government of Canada 1996, 7. However, the government's request for a voluntary moratorium has proven to be ineffective (see Caulfield *et al.* 1997, 8).

⁷ See Health Canada 2001a. See also Health Canada 2001b and Caulfield 2001.

draft for discussion with the intention that the final version will be presented in 2002.

This proposed legislation prohibits a person from knowingly acting to ensure or increase the probability that an embryo will be of a particular sex, except for reasons related to the health of the resulting human being (s. 3(1)(h)).

An embryo is defined as "a human organism during the first 56 days of its development following fertilisation or creation, excluding any time in which its development has been suspended" (s. 2).

Thus, the proposed legislation clearly covers the use of "sperm-sorting techniques"⁸ and sex-selection of an embryo below 56 days old.

Denmark Law No. 460 of 1997⁹ Permitted.

Under s. 7(1) "The genetic examination of a fertilized oocyte may only be carried out in cases where there is a known and considerable risk that the child will be affected by a serious hereditary disease."

Also, under 7(2) "A genetic examination may in addition be carried out in connection with artificial fertilization outside the woman's body on the grounds of infertility, where such an examination may establish or rule out the presence of an important chromosome abnormality."

Sperm or fertilised eggs can only be selected for sex before implantation to avoid "a serious sex-linked hereditary disease" (s. 8).

No new therapeutic and diagnostic methods can be introduced in connection with artificial fertilisation before they have been approved from ethical and

technical health standpoints by the Minister of Health (s. 21(1)).

Finland	None.	Permitted by default. ¹¹
	Proposed legislation exists ¹⁰	A working group report, given to the Ministry of Justice in 1997, recommended that assisted reproduction should not be allowed for the purpose of choosing a child's sex or characteristics, except to avoid serious hereditary sex-related disease. ¹²
France	Law 94-654 of 29 July 1994, Art. 14 (Public Health Code, Art. L. 162-17) ¹³	Diagnosis carried out on cells taken from an <i>in vitro</i> embryo is permitted, exceptionally, where (a) it is undertaken in a centre licensed by the National Committee for Medicine and Biology of Reproduction and Antenatal Diagnosis; (b) the couple in question provides written consent and has a high probability of producing a child with a particularly serious and incurable genetic disease; and (c) the abnormality leading to such disease has been precisely identified in one of the parents. (Public Health Code, Art. L. 162-17.) ¹⁶
	Decree 97-578 of 28 May 1997 (Art. R. 162-17 to 31 in the Code) ¹⁴	
	Decree 98-216 of 24 March 1998 (Art. R. 162-32 to 43 in the Code) ¹⁵	The practitioner authorised to perform the diagnosis must explain to the couple the medical and technical constraints affecting the diagnosis. The practitioner must also inform the couple of the different stages of genetic diagnosis and the degree of reliability of the analyses. (Art. R 162-33)
Germany	Embryo Protection Act 1990 ¹⁷	It is an offence to fertilise a human egg for any purpose other than to start a pregnancy in the woman who produced the egg (s. 1(1)(2)). Also, it is an offence to produce or remove an embryo for a

¹⁰ Information provided by Salla Lötjönen.

¹¹ See Schenker 1997, 178.

¹² Information provided by Annamari Hynninen.

¹³ For an English translation see Bulletin of Medical Ethics 1994.

¹⁴ Information provided by Pierre Langeron.

¹⁵ For an English translation see International Digest of Health Legislation 1998.

¹⁶ These provisions were implemented by "décrets d'application" some years after the majority of the legislation came into force. Information provided by Pierre Langeron.

¹⁷ For an English translation see Bulletin of Medical Ethics 1990.

⁸ See also Health Canada 2001b, 6.

⁹ For an English translation see International Digest of Health Legislation 1997.

purpose not serving its preservation (s. 2(2)), and an embryo is defined to include any totipotent cell removed from an embryo that is assumed to be able to divide and develop into an individual (s. 8(1)). Thus, PGD is implicitly prohibited.

It is an offence to fertilise a human egg with a sperm that has been selected for the sex chromosome contained in it, unless this has been done to avoid Duchenne-muscular dystrophy or a similarly severe sex-linked genetic illness. The illness threatening the child must be recognised as being of appropriate severity in the applicable state (Länder) law (s. 3).

In February 2000, the Medical Assembly issued guidelines on PGD proposing that it should be allowed, but restricted to cases where there is a known predisposition for severe genetic disease.¹⁸

Greece None¹⁹

Permitted by default.²⁰

A National Bioethics Committee has been established to investigate the issues raised by the application of biological sciences and to investigate their moral, legal, and social dimensions and consequences.²¹

Ireland Eighth Amendment to the Constitution (Art. 40.3.3).

No specific legislation

Any diagnosis of the pre-implantation embryo is implicitly prohibited, as the Eighth Amendment states, "The State acknowledges the right to life of the unborn and, with due regard to the equal right to life of the mother, guarantees in its laws to respect, and, as far as practicable, by its laws to defend and vindicate that right."

An amendment to the constitution is

The proposed amendment prohibits abortion, defined as "the intentional destruction by any means of an

under consideration²²

unborn human life after implantation in the womb of a woman" with a specified exception (s.1 of the Bill). Thus, the embryo will not receive legal protection until implantation.

This will be put to the people in a referendum.²³

Italy

None

Permitted by default.

The Ethical Code of Practice 1998 restricts genetic tests to diseases and requires certain information to be offered to the parents.²⁴ It is an open question whether this code is legally binding.²⁵

Luxembourg

No information

No information.

Netherlands

None

Permitted by default.²⁶

Proposed legislation exists

In late 2000, the Dutch government proposed legislation prohibiting sex determination.²⁷

Portugal

None

Permitted by default.²⁹

Some provisions of the constitution might be relevant²⁸

Art. 67.2(e) places a duty on the State to protect the family by "regulating assisted procreation, in such terms as safeguard human dignity."

Art. 26.3 states that,

²² Twenty-fifth Amendment to the Constitution (Protection of Human Life in Pregnancy) Bill 2001. See the Irish Department of Health Website: <http://www.doh.ie/pdfdocs/proporot.pdf>.

²³ Explanatory memorandum (<http://www.doh.ie/pdfdocs/proporot.pdf>).

²⁴ Information provided by Roberto Mordacci.

²⁵ A recent judicial sentence (Tribunale di Roma, 14 February 2000) recognised the right of a couple to have access to a surrogate mother, notwithstanding a contrary provision of the Ethical Code of Practice. (Information provided by Roberto Mordacci.)

²⁶ See Schenker 1997, 178.

²⁷ See the Dutch Ministry of Health, Welfare and Sport website: <http://www.minvws.nl>.

²⁸ For an English translation of Constitutional Law no. 1/97 of 20 September 1997 see http://www.parlamento.pt/leis/constituicao_ingles/crp_uk.htm. I am grateful to João Loureiro for drawing my attention to these provisions.

²⁹ Information provided by André Pereira.

¹⁸ See Sentker 2000.

¹⁹ Information provided by Tina Garanis-Papadatos and Panagiota Dalla-Vorgia.

²⁰ Information provided by Tina Garanis-Papadatos and Panagiota Dalla-Vorgia.

²¹ Information provided by Panagiota Dalla-Vorgia

"The law shall guarantee the personal dignity and genetic identity of the human being, particularly in the creation, development and use of technology and in scientific experimentation."

Sex selection is not expressly prohibited. However, some constitutional protection is granted to embryos and fetuses under Art. 24 (the right to life),³⁰ and Art. 26, no. 3 states,

"The law shall guarantee the personal dignity and genetic identity of the human being, particularly in the creation, development and the use of technology and in scientific experimentation."

More specifically, Art. 13 prohibits any form of discrimination against anyone by reason of their sex. However, "there is no criminal protection for situations in which the sex is chosen for an *in vitro* embryo."³¹

Spain	Law 35 of November 1988 ³²	Assisted reproduction is expressly allowed for the prevention and treatment of illnesses of a genetic or hereditary origin (s. 12(1)). However, genetic selection for "non-pathological" characteristics is prohibited (s. 13).
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Sweden	None	PGD is not directly covered by 1991: 115 (which is restricted to experiments on, and storage of, embryos) or 1991: 114 (which is restricted to certain types of medical screening). ³³
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A research project involving PGD would, like embryo research, fall under the 1991: 115. Act 1991: 114 only applies to a "general health survey."³⁴

³⁰ See Pereira 2001, 495.

³¹ Pereira 2001, 497.

³² An English version of this Act appears in *Official Bulletin of the State*, No. 282, Thursday 24 November 1988.

³³ For English translations of these Acts, see Ministry of Health and Social Affairs 1991 Appendices 1 and 2.

³⁴ Suggested by Elisabeth Rynning as a more precise translation of the Act's provisions than the phrase "medical screening" used in *ibid*.

Thus, only a general screening or research project using PGD would fall within the legislative rules.

Parliament has declared (without adopting any legislation on the matter) that PGD should be permitted only for the diagnosis of serious, progressive, hereditary disease that leads to premature death and for which there is no cure or treatment.³⁵

In 1999, the National Board on Health and Welfare published guidelines in the area of "gene ethics and gene technology in health care." These guidelines reiterate the Parliamentary statement and stress that PGD cannot be considered part of routine health care, and recommend that some kind of ethical review or ethics consultation should take place.³⁶

UK	Human Fertilisation & Embryology Act 1990	Permitted under licence from the Human Fertilisation and Embryology Authority.
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Research licences can also be granted for any activity that is "necessary or desirable" for the purpose of "developing methods for detecting the presence of gene or chromosome abnormalities in embryos before implantation" (Sch. 2, para. 3(2)(e)).

The licensing authority's *Code of Practice* declares that, "Centres should not select the sex of their embryos for social reasons."³⁷

US	No federal legislation	Permitted subject to any relevant state legislation.
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³⁵ Information provided by Elisabeth Rynning.

³⁶ Information provided by Elisabeth Rynning.

³⁷ HFEA 2001, para. 9.9.

Appendix 3

The Legality of *In Vitro* Embryo Research¹

<i>Country</i>	<i>Legislation</i>	<i>Legality of in vitro embryo research</i>
Austria	Act No. 275 of 1 July 1992 ²	Embryo research is prohibited, though examination and treatment may be allowed if it is necessary to achieve a pregnancy (s. 10). ³ There is a fine for violation. ⁴
Belgium	None	Embryo research is permitted by default. ⁵ In practice, only two of the Free Universities undertake embryo research. ⁶ The Committee of Medical Ethics of the National Scientific Research Fund recommends that research should seek to enhance the chance of implantation in the uterus and not be performed after 14 days. Proposed legislation exists
		Two proposals for legislation are currently under consideration by the Belgium senate. The draft laws propose a ban on the creation of embryos for research. The use of surplus embryos for which there is no prospect of implantation will, however, be permitted, subject to conditions. One of which is

¹ A version of this table appeared in Beyleveld and Pattinson 2000b. In this book, the term "embryo research" is defined to exclude experimental treatment that is for the direct benefit of the embryo (see 4.5, above).

² See Kriari-Catranis 1997, 58; and Gunning and English 1993, 147 and 171.

³ See Kriari-Catranis 1997, 58; and Gunning and English 1993, 148 and 171.

⁴ See Bernat 1993, 501.

⁵ See Gunning and English 1993, 148 and 172.

⁶ See Schenker 1997, 181. For a wider discussion, see Gunning and English 1993, 148.

that the embryos are less than 15 days old and are destroyed on completion of the research.⁷

Canada

None

The Discussion Group on Embryo Research, reporting in 1995, recommended that research be permitted on embryos up to 14 days after fertilisation, and that a national body be created to licence such research.⁸ It did, however, recommend the prohibition of creating embryos solely for research, thereby departing from the view of the Royal Commission on New Reproductive Technologies.⁹

Proposed
legislation exists:
Assisted Human
Reproduction Act

There have been a number of bills that failed or were dropped. Under bill C-47 (which was dropped in 1997 as a result of the federal election) embryo research was prohibited later than 14 days after conception. This is done by prohibiting the maintenance of an embryo outside the body (s. 4(1)(j)), and defining an embryo as "a human organism during the period of its development beginning on the fifteenth day and ending on the fifty-sixth day following fertilisation."

In May 2001, the federal government released a *Proposal for Legislation Governing Assisted Human Reproduction*.¹⁰ This proposal has been distributed in draft for discussion with the intention that the final version will be presented in 2002.

If enacted contravention of its provision would be a criminal offence punishable by a heavy fine or imprisonment (ss. 34 & 35).

The proposed legislation prohibits the creation of an "*in vitro* embryo solely for the purposes of research" (s. 3(1)(d)).

⁷ See European Parliament 2001b, 4.

⁸ See Discussion Group on Embryo Research 1995, 2, and 14.

⁹ See Discussion Group on Embryo Research. 1995, 6, 18-19.

¹⁰ See Health Canada 2001a. For discussion of this proposed legislation, see Health Canada 2001b and Caulfield 2001.

A licence would be required to "make use of any *in vitro* embryo or part of one for the purpose of research or the prevention, diagnosis or treatment of a disease, injury or disability" (s. 8(2)). Regulations would be developed setting out the conditions for embryo research (ss. 12 & 40(1)(d)). It would, however, be a criminal offence to maintain an embryo outside of the body for longer than 14 days after creation (s. 3(1)(c)). Thus, embryo research on surplus embryos would be permitted, subject to conditions, up to 14 days after its creation.

Denmark

Law No. 460
of 1997¹¹

Embryo research is permitted under certain conditions. Under s. 25(1) experiments on fertilised eggs, and gametes intended for use in fertilisation, may only be carried out

"1. for the purpose of improving *in vitro* fertilization or similar techniques intended to bring about pregnancy; and

2. in order to improve techniques for the genetic testing of a fertilized oocyte with a view to establishing the possible presence of a serious hereditary disease or an important chromosome abnormality (preimplantation diagnosis)."

Fertilised eggs can only be kept *in vitro* for up to 14 days (excluding periods of cryo-preservation) (s. 26).

Embryos that have been genetically modified or which might have been damaged by research activities may not be re-implanted (s. 27(1)).

All research projects must be approved by an ethics committee (s. 27(2))

European
Convention

The Convention on Human Rights and Biomedicine has been ratified without making any reservation to Article 18(2), which prohibits the creation of embryos for research.

¹¹ For an English translation see International Digest of Health Legislation 1997.

Finland	Medical Research Act No. 488 of 1999 ¹²	<p>Embryo research is permitted under licence up to 14 days after fertilisation (excluding periods of cryo-preservation) (s. 11). Written consent has to be obtained from the gamete donors (s. 12). Creation of embryos for research is prohibited. Fertilised eggs that have been subject to research cannot be transferred to the womb, and they are not to be kept alive for more than 14 days after fertilisation. The maximum time limit for cryo-preservation of embryos to be used for research is 15 years after which the embryos are to be disposed of (s. 13).</p> <p>Violation of s. 11 or s. 13 is sanctioned by up to one year imprisonment or a fine (s. 25). Violation of s. 12 is sanctioned by a fine (s. 27).</p>
France	<p>Law 94-653 of 29 July 1994, Art. 9 (which forms part of the Penal Code, Art. 511-18/19)</p> <p>Law 94-654 of 29 July 1994, Art. 8, Art. L. 152-8)¹³</p> <p>Decree No. 97-613 of 27 May 1997, Art. R. 152-8-1 to 12)¹⁵</p>	<p>The creation of human embryos <i>in vitro</i> for study, research, or experiments is prohibited (Art. L. 152-8, Public Health Code).</p> <p>Any experiment on an embryo is forbidden. "Exceptionally", the couple may permit studies to be carried out on the embryo, provided they give written consent, and the studies have a medical purpose, do not impair the embryo, and have the approval of the National Committee for Medicine and Biology of Reproduction and Antenatal Diagnosis¹⁴ (Art. 152-8).</p> <p>Experimentation is only allowed where there is a direct advantage for the embryo itself (especially to help a successful implant), or it will contribute to the improvement of medically assisted reproduction techniques (Art. R. 152-8-1 to 12). Thus, only non-destructive experimentation is allowed.</p>

¹² For an English translation see Bulletin of Medical Ethics 2000.

¹³ For an English translation see Bulletin of Medical Ethics 1994.

¹⁴ "Commission Nationale de médecine et de biologie de la reproduction et du diagnostic prénatal," English translation derived from CCNE 1998, 9.

¹⁵ Information provided by Pierre Langeron. See European Parliament 2001a, 16.

No embryo age limit is provided.¹⁶

A human embryo may not be conceived or used for commercial or industrial purposes (Art. 152-7).

Any violation of the law is severely sanctioned (7 years imprisonment and FF 700 000 penalty).¹⁷

Research on *in utero* embryos is permitted with the approval of the National Committee for Medicine and Biology of Reproduction and Antenatal Diagnosis.¹⁸

The National Consultative Ethics Commission (CCNE) recommended,

(a) the word "research" replace the word "experiments" in the text of the Art. 152-8;

(a) all embryo research projects be examined on a case-by-case basis by the National Committee for Medicine and Biology of Reproduction and Antenatal Diagnosis;

(b) the law should distinguish between research on the embryo for the purpose of intra-uterine transfer, and research that does not aim to do so; and

(c) the maintenance of the ban on the deliberate creation of embryos for research purposes.¹⁹

Similar recommendations were made in January 2001. The CCNE was of the opinion that the proposed legislation should include a firm reminder that the creation of embryos for research is prohibited, and recommended allowing controlled use of spare IVF embryos for research purposes (in particular research on embryonic stem cells).²⁰

¹⁶ Information provided by Pierre Langeron. Cf. MacKellar 1997, 9 and European Parliament 2001b, 5 who state that a seven day period is imposed. Similarly, European Parliament 2001a, 16 declares that Decree No. 97 lays down a seven day time limit.

¹⁷ Information provided by the EGE (European Group on Ethics) Secretariat in 1998.

¹⁸ Information provided by Pierre Langeron.

¹⁹ See CCNE 1998, 9.

²⁰ See CCNE 2001.

Germany	Embryo Protection Act 1990 ²¹	It is an offence to (a) fertilise a human egg for any purpose other than to start a pregnancy in the woman who produced the egg (s. 1(1)(2)); and (b) use an embryo for any purpose not serving its preservation (s. 2(1)), where an embryo is defined to include any totipotent cell removed from an embryo that is assumed to be able to divide and develop into an individual (s. 8(1)). Thus, embryo research is prohibited. If neither treatment (as above) nor implantation is possible, the physician can only avoid punishment by allowing any surplus embryos to die. ²² Violation of the law is severely sanctioned (up to three years imprisonment or a fine: s. 2).
Greece	None	Embryo research is permitted by default. ²³ The Greek Central Council for Health recommended that research on embryos should be permitted only during the first 14 days from fertilisation. A National Bioethics Committee has been established to investigate the issues raised by the application of biological sciences and to investigate their moral, legal, and social dimensions and consequences. ²⁴
	European Convention	The Convention on Human Rights and Biomedicine has been ratified without making any reservation to Article 18(2), which prohibits the creation of embryos for research.
Ireland	The Constitution	Implicitly prohibited under the Eighth Amendment to the Constitution, which states,

²¹ For an English translation see Bulletin of Medical Ethics 1990.

²² See Vitzthum and Kämmerer 1999, 316.

²³ See Gunning and English 1993, 172; and Schenker 1997, 180. Additional information provided by Tina Garanis-Papadatos and Panagiota Dalla-Vorgia.

²⁴ Information provided by Panagiota Dalla-Vorgia

		"The State acknowledges the right to life of the unborn and, with due regard to the equal right to life of the mother, guarantees in its laws to respect, and, as far as practicable, by its laws to defend and vindicate that right." ²⁵
	No specific legislation.	The Medical Council's ethical guidelines state that, "Any fertilised ovum must be used for normal implantation and must not be deliberately destroyed" (para. 26.4). Also, it would be professional misconduct to create embryos for experimental purposes (para. 26.2). ²⁶ Thus, embryo research is practically impossible for registered medical practitioners (the guidelines do not apply to other persons). The Government set up a Commission on Assisted Reproduction in 2000 to report on, <i>inter alia</i> , embryo research.
Italy	None	Embryo research is permitted by default.
	Proposed legislation exists	A "Disegno di legge" on medically assisted reproduction was passed by the Lower Chamber of Parliament on May 26 1999. This permitted embryo research only for therapeutic and diagnostic reasons for the protection of the health and development of the embryo. It prohibited the production of embryos for research. ²⁷ It was not, however, passed by the Upper Chamber. ²⁸ A proposed law on the protection of embryos has been under consideration since 21 June 2000. ²⁹
Luxembourg	None	No embryo research is being performed.
	Proposed legislation exists	The proposed legislation, Law No. 4567, prohibits the creation of embryos for research (Art. 8). In

²⁵ See also *Attorney General v X* [1992] 1. I.R. 1.

²⁶ Information provided by Deirdre Madden.

²⁷ Information provided by Roberto Mordacci.

²⁸ See Pacitti 2000, 19.

²⁹ See European Parliament 2001b, 5.

exceptional circumstances, with the approval of the National Committee of Reproductive Medicine and Biology, medical research may be undertaken under the conditions specified by the Grad Ducal regulation (9 January 1997).³⁰ Thus, experiments may be permitted on surplus embryos up to 14 days after fertilisation, where they have a medical aim and do not endanger the embryo.³¹

Under Art. 15 non-profit making establishments can collect, treat, and preserve gametes. Art. 28 makes it a criminal offence to obtain embryos by payment.³²

Netherlands None

Embryo research is permitted by default.³³

The Health Council has recommended that an embryo should not be grown *in vitro* beyond 14 days following fertilisation.³⁴ It also recommended that legislation be passed which should

- (a) permit *in vitro* embryo research after obtaining the approval of the Central Committee;
- (b) contain no ban on the creation of embryos for research; and
- (c) should prohibit transferring embryos used for research to the womb.³⁵

Proposed
legislation exists:
The Embryo Bill

In late 2000, the government put forward legislation seeking to prohibit the creation of embryos solely for research. This proposed legislation provides for a future Royal Decree lifting the general ban subject to conditions. It is envisaged that this decree will be passed between three and five years after the legislation comes into force. With the aim of ratifying the Convention on Biomedicine and Human rights, the Bill also

provides for a reservation to its ban on the creation of embryos for research (so that it can give effect to the Royal Decree in the future).³⁶

The proposed legislation allows scientific research on surplus embryos where it is "aimed at providing new insights in the field of medical science."

Portugal None³⁷

Embryo research is permitted by default.³⁸ The National Council of Ethics for the Life Sciences has declared that the production of embryos for research is "ethically unacceptable."³⁹

Constitution⁴⁰

Some Constitutional provisions might be relevant. Art. 26 states that,

"The law shall guarantee the personal dignity and genetic identity of the human being, particularly in the creation, development and use of technology and in scientific experimentation."

Also, Art. 67.2(e) places a duty on the State to protect the family by "regulating assisted procreation, in such terms as safeguard human dignity."

European
Convention

The Convention on Human Rights and Biomedicine has been ratified without making any reservation to Article 18(2), which prohibits the creation of embryos for research.

Proposed
legislation exists

In 1998, Parliament accepted legislation on medically assisted procreation. It has, however, remained unpublished because the President of the Republic applied his right to veto.⁴¹ This legislation would have prohibited the creation or use of embryos for research, but would have allowed

³⁰ See European Parliament 2001a, 17.

³¹ See European Parliament 2001b, 4 and 8.

³² See European Parliament 2001a, 17.

³³ See, e.g., Gunning and English 1993, 172.

³⁴ See Health Council of the Netherlands 1998, 61.

³⁵ See Health Council of the Netherlands 1998, 13-14, 61.

³⁶ See the Dutch Ministry of Health, Welfare and Sport website: <http://www.minvws.nl>.

³⁷ See Oliveira 1996, 68.

³⁸ According to the EGE 2000, 11: "no embryo research seems to be performed."

³⁹ See National Council of Ethics for the Life Sciences 1995, especially 10.

⁴⁰ For an English translation see http://www.parlamento.pt/leis/constituicao_ingles/crp_uk.htm. João Carlos Loureiro kindly drew my attention to these provisions.

⁴¹ Information provided by João Carlos Loureiro. See also European Parliament 2001b, 6.

		experimental treatment performed to benefit the embryo. ⁴²
Spain	Law 35 of November 1988 ⁴³	<p>Research on embryos is permitted up to 14 days after fertilisation, provided the parties concerned give their written consent (ss. 15(1)(3) & 20).</p> <p>Research can only be conducted on viable embryos if it is applied research of a diagnostic character or if it has a therapeutic or prophylactic purpose, and the "non-pathological genetic patrimony is not modified" (s. 15(2)).</p> <p>Research on non-viable embryos must not be capable of being carried out on an animal model, and must be authorised by the competent scientific and health authorities or, by delegation, by the Multi-disciplinary National Committee (s. 15(3)).</p> <p>Research must have a purpose laid down in s. 16, such as the improvement of the techniques of assisted reproduction; or increasing knowledge about infertility, gene and chromosome structure, contraception, or the origin of genetic and hereditary diseases.</p> <p>Other purposes can be authorised by regulation or by the Multidisciplinary National Committee (s. 16(1)(k)).</p> <p>The creation of embryos for research is prohibited (s. 3).</p>
Sweden	Law No. 115 of 14 March 1991 ⁴⁴	Measures (including experiments for research or treatment) involving fertilised ova require the

⁴² See Pereira 2001, 507-508.

⁴³ An English version is in *Official Bulletin of the State*, No. 282, Thursday 24 November 1988.

For a long time this Act remained unimplemented due to being challenged as unconstitutional. However, in July 1999 the Supreme Court ruled that it was constitutional, and it has since been implemented.

⁴⁴ An English translation of this Act appears in Ministry of Health and Social Affairs 1991, Appendix 2.

		consent of the donors of the gametes (s. 1).
		Embryos that have been subjected to experiments must be destroyed at the end of the 14th day (s. 2).
		A fertilised ovum may be stored in a frozen state for up to five years or for a longer period determined by the National Board of Health and Welfare under s. 5. (s. 3, as amended in 1998). ⁴⁵
		No gametes or embryos that have been the subject of research can be transferred to the woman's body (s. 4).
		Breaches of ss. 2, 3, or 4 are sanctioned by a fine or up to one year imprisonment. Liability is imposed for a minor offence under s. 3. Any prosecution for offences under this Act can only be instigated with the consent of the National Board of Health and Welfare (s. 6).
		In practice, embryo research will often be approved by an ethics committee. ⁴⁶
UK	Human Fertilisation & Embryology Act 1990	<p>Research on embryos is permitted under licence up to the appearance of the primitive streak or up to 14 days after fertilisation, whichever is the earliest (ss. 3(3)(a) & 3(4)).</p> <p>An embryo is defined as a live egg that has been fertilised or is in the process of fertilisation (ss. 1(1)(a) & (b)).</p> <p>Embryos that have been the subject of research may not be returned to the womb (s. 15(4)).</p> <p>The creation of embryos specifically for research is permitted under licence (Sch. 2, para. 3(1)).</p> <p>Any research must be "necessary or desirable" for</p>

⁴⁵ Information on the amendment, whereby the storage period was increased from one to five years, provided by Elisabeth Rynning.

⁴⁶ Information provided by Elisabeth Rynning.

promoting advances in the treatment of infertility; knowledge about congenital disease, miscarriage, or contraception; or detection of gene or chromosome abnormalities (Sch. 2, para. 3(2)). There are now two additional purposes, see below.

The Secretary of State may pass regulations extending the purposes for which embryo research is permitted (Sch. 2, para. 3(2)). However, the purposes that may be added are restricted to research that would increase knowledge about the creation and development of embryos, or about disease, or enable such knowledge to be applied (Sch. 2, para. 3(3)).

Human
Fertilisation &
Embryology
(Research
Purposes)
Regulations 2001

The purposes for which research can be performed now include increasing knowledge about the development of embryos and about serious disease, and enabling such knowledge to be applied in developing treatments for serious disease (Reg. 2).

US

Legislation on
Congressional
appropriations for
DHHS
(Department of
Health & Human
Services)
activities⁴⁷

None of the funds appropriated for the activities of the DHHS may be used for
(a) creating human embryos for research; or
(b) "research in which a human embryo or embryos are destroyed, discarded, or knowingly subjected to risk of injury greater than that allowed for research on fetuses *in utero* under 45 CFR 46.208(a)(2) and section 498(b) of the Public Health Service Act (42 USC 289g(b))."⁴⁸

"Human embryo" is defined as "any organism... derived by fertilization, parthenogenesis, cloning, or any other means from one or more human gametes or human diploid cells."⁴⁹

In 1994, the NIH Human Embryo Research Panel supported federal funding for research on existing

⁴⁷ The relevant provisions have been "included in Congressional appropriations for DHHS activities since 1996, without alteration" (Flannery and Javitt 2000, D-6).

⁴⁸ Flannery and Javitt 2000, D-6.

⁴⁹ Ibid.

unused embryos up to 14 days after fertilisation, and the creation of embryos for research in exceptional cases.⁵⁰ The Panel did, however, consider the implantation of research embryos and sex selection (except to avoid X-linked disease) to be unacceptable.⁵¹

Also, the National Bioethics Advisory Commission (NBAC) has argued in favour of federal funding for certain research on surplus embryos.⁵²

Private and university based research has been performed in the context of infertility treatment.⁵³ Also, embryos have been created for research.⁵⁴

The DHHS has ruled that human embryonic stem cells fall outside the ban on federal funding of embryo research.⁵⁵ More recently, President Bush announced that federal funding will be available for stem cell research on existing cell cultures, but would not be available for research on stem cells that had not been derived from embryos already existing at the time of the announcement.⁵⁶

Individual state
laws.⁵⁷

At least ten states have law regulating research on *in vitro* embryos, nine of which ban such research altogether.⁵⁸

⁵⁰ See NBAC 1999, Chapter 5.

⁵¹ See Eisenberg and Schenker 1997, 16.

⁵² See NBAC 1997.

⁵³ See Eisenberg and Schenker 1997, 16.

⁵⁴ See Josefson 2001.

⁵⁵ See Meyer 2000, 166; Flannery and Javitt 2000, D-3.

⁵⁶ See Fletcher 2001.

⁵⁷ See Andrews 2000, especially Appendix A.

⁵⁸ See Andrews 2000, especially A-4.

Appendix 4

The Legality of Cloning¹

<i>Country</i>	<i>Legislation</i>	<i>Legislative provisions concerning cloning additional to those addressing embryo research</i>
Austria	Act No. 275 of 1 July 1992 ³	Cloning is indirectly prohibited. ²
Belgium	None Legislation is being considered ⁴	None.
Canada	None Proposed legislation exists: Assisted Human Reproduction Act	A voluntary moratorium on the cloning of human embryos has existed since July 1995. ⁵ There have been a number of bills that failed or were dropped. Bill C-47 (which was dropped in 1997) prohibited the manipulation or implantation of an ovum, zygote, or embryo for the purpose of producing a zygote or embryo that contains the same genetic information as a living or deceased human being or a zygote, embryo, or fetus: s. 4(1)(a). A Tri-Council Policy Statement recommends a legislative prohibition of cloning. ⁶ In May 2001, the federal government released a <i>Proposal for Legislation Governing Assisted</i>

¹ A version of this table originally appeared in Beyleveld and Pattinson 2000b.

² Information provided by Hille Haker.

³ Information provided by Hille Haker.

⁴ See HGAC and HFEA 1998b, Annex E.

⁵ See Government of Canada 1996, 7. However, the government did little more than request a voluntary moratorium, which has proved to be ineffective (see Caulfield *et al.* 1997, 8).

⁶ See Medical Research Council of Canada *et al.* 1998, Articles 9.5. and 9.3.

*Human Reproduction.*⁷ This proposal has been distributed in draft for discussion with the intention that the final version will be presented in 2002.

The proposed legislation makes it a criminal offence for a person to knowingly "create or participate in the creation of a human clone or transplant or participate in the transplantation of a human clone into a human being" (s. 3(1)(a)).

A "human clone" is defined as "an embryo that as a result of the manipulation of human reproductive material contains the same nuclear deoxyribonucleic acid sequence as is found in the cell of a living or deceased human being, foetus or embryo" (s. 2).

It would also be a criminal offence to "create or participate in the creation of an embryo from a cell or part of a cell taken from an embryo or foetus, or transplant or participate in the transplantation of such an embryo into a human being" (s. 3(1)(e)).

Thus, cloning (both reproductive and therapeutic) would be prohibited.

Denmark Law No. 460 of 1997⁸

Research on, and assisted reproductive treatment with the aim of, producing genetically identical individuals is prohibited, as is nuclear substitution.

Assisted fertilisation may only take place if its objective is the uniting of a genetically unmodified egg with a genetically unmodified sperm cell (s. 2).

The implantation ("either simultaneously or successively") of identical fertilised or unfertilised eggs into one or several women is prohibited (s. 4).

"Experiments intended to enable production of genetically identical human individuals" are not allowed (s. 28).⁹

⁷ See Health Canada 2001a. For discussion of this proposed legislation, see Health Canada 2001b and Caulfield 2001.

⁸ For an English translation see International Digest of Health Legislation 1997.

⁹ As translated in Danish Council of Ethics 2001.

Finland	Medical Research Act No. 488 of 1999 ¹⁰	Conducting medical research for the purpose of facilitating the cloning of human beings is a criminal offence and sanctioned by up to two years imprisonment or a fine (s. 26).
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France	Laws 94-653 and 94-654 of 29 July 1994 ¹¹	The embryo research that would be necessary to clone a human being is prohibited. Thus, human cloning is implicitly prohibited. This is conclusion supported by the Parliamentary preliminary works, ¹² and re-affirmed by opinion No. 54 of the National Consultative Commission of Ethics (CCNE). ¹³
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The CCNE, in its Opinion No. 54 of 22 April 1997, opposed the production of identical human beings. It was divided on whether more explicit wording should be added when the legislation is revised. A later opinion, No. 60 of June 25 1998, recommended (by majority) making the prohibition more explicit, and proposed inviting a resolution by the General Assembly of the UN to proscribe human reproductive cloning. In its Opinion No. 67 of 18 January 2001, the CCNE again recommended explicit prohibition of reproductive cloning—this time unanimously.¹⁴

Germany	Embryo Protection Act 1990 ¹⁵	It is an offence to create an embryo that is genetically identical to another embryo, fetus, or any living or dead person (s. 6).
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The Act does not define the key phrase; translated by Winter as "genetically identical,"¹⁶ and the Bulletin of Medical Ethics as "with same genetic information."¹⁷

¹⁰ For an English translation see Bulletin of Medical Ethics 2000.

¹¹ For an English translation see Bulletin of Medical Ethics 1994.

¹² Information provided by Pierre Langeron.

¹³ See CCNE 1997.

¹⁴ See CCNE 1997, 1998, and 2001, respectively.

¹⁵ For an English translation see Bulletin of Medical Ethics 1990.

¹⁶ See Winter 1991, 191.

¹⁷ Winter 1991, 191 and Bulletin of Medical Ethics 1990, 10, respectively. Also, translated as "having the same genetic information" in European Parliament 2001b, 3.

		Violation of the law is severely sanctioned (up to five years imprisonment or a fine): s. 6.
Greece	None	None.
	European Convention	Greece has signed and ratified the European Convention on Human Rights and Biomedicine and its additional protocol prohibiting cloning.
		The Greek Central Council for Health has recommended that assisted reproduction should not be used for the creation of genetically identical human beings. ¹⁸
		A National Bioethics Committee has been established to investigate the issues raised by the application of biological sciences and to investigate their moral, legal, and social dimensions and consequences. ¹⁹
Ireland	None	The legal position is uncertain. One commentator states that use of the Dolly technique might be affected by the Control of Clinical Trials Act 1987 and the Control of Clinical Trials and Drugs Act 1990, if they are not "too vague in their nature to include the procedure." ²⁰
		The Medical Council does, however, have guidelines. ²¹ Para. 26.1 of the Medical Guidelines 1998 state,
		"The creation of new forms of life for experimental purposes or the deliberate and intentional destruction of human life already formed is professional misconduct."
		Para. 26.2 limits the manipulation of sperm or eggs to the "improvement of health." It adds,
		"However, if the intention is not so directed or is the creation of embryos for experimental purposes, it would be professional misconduct."

¹⁸ See Dalla-Vorgia 1996, 281.

¹⁹ Information provided by Panagiota Dalla-Vorgia.

²⁰ Sheikh 1997, 95.

²¹ See Ahlstrom 2001.

		Doctors who practice medicine outside these ethical limits are open to sanction by the council, including removal of their licence to practice in Ireland. However, the guidelines "only apply to registered medical practitioners and would be ineffective in the case of any service operated by other persons." ²²
		The Government set up a Commission on Assisted Human Reproduction in 2001, which will report on, <i>inter alia</i> , cloning. ²³
Italy	The Minister of Health issued a decree on 5 March 1997 ²⁵	The decree prohibits all forms of experimentation and intervention aimed at (even indirectly) cloning a human or animal. ²⁴
		The National Bioethics Committee (CNB) has expressed the view that cloning should be prohibited. ²⁶
	Proposed legislation exists	A series of laws have been proposed, including law S.2433 on the protection of embryos, which has been under consideration since 21 June 2000. ²⁷
		Under the proposed law, human cloning is banned, and transgressors will be punished with 10-20 year sentences. ²⁸
Luxembourg	None	None.
Netherlands	None	None.
	European Convention	The Netherlands has signed the Convention on Human Rights and Biomedicine and its Additional

²² See Irish Department of Health website: <http://www.doh.ie>, "Assisted Reproduction Commission set up" dated 25 February 2000.

²³ Ibid.

²⁴ See UNESCO 1998, 10.

²⁵ See UNESCO 1998, 10. Such decrees have legal force for only 90 days unless converted by a vote of the Parliament. This did not initially happen. However, it has since been renewed. Information provided by Roberto Mordacci.

²⁶ See UNESCO 1998, 10.

²⁷ See European Parliament 2001b, 5.

²⁸ See Simini 1999, 1950.

Protocol. It has, however, added the following declaration,

"In relation to Article 1 of the Protocol, the Government of the Kingdom of the Netherlands declares that it interprets the term 'human beings' as referring exclusively to a human individual, i.e., a human being who has been born."

Proposed
legislation
exists²⁹

In 1998 the government proposed to pass legislation prohibiting the cloning of human beings, but permitting the use of cloning techniques in embryo research (before 14 days after conception).³⁰

However, in late 2000, the government proposed legislation prohibiting the creation of embryos for research and prohibiting human cloning.³¹

Portugal

None³²

The National Council of Ethics for the Life Sciences has expressed the view that the cloning of human beings is "ethically unacceptable" and must be prohibited.³³

Some provisions
of the
Constitution
might be
relevant³⁴

Art. 26 states that,

The law shall guarantee the personal dignity and genetic identity of the human being, particularly in the creation, development and use of technology and in scientific experimentation."

Also, Art. 67.2(e) places a duty on the State to protect the family by "regulating assisted procreation, in such terms as safeguard human dignity."

²⁹ Information provided by Ghislaine van Thiel.

³⁰ Information provided by Ghislaine van Thiel.

³¹ See the Dutch Ministry of Health, Welfare and Sport website: <http://www.minvws.nl>.

³² By implication, see National Council of Ethics for the Life Sciences 1997, 2.

³³ See National Council of Ethics for the Life Sciences 1997, 2.

³⁴ For an English translation see http://www.parlamento.pt/leis/constituicao_ingles/crp_uk.htm. João Carlos Loureiro kindly drew my attention to these provisions.

Proposed
legislation
exists

The law on assisted procreation, passed by the Assembleia de República but vetoed by the President, made cloning a criminal offence.³⁵

European
Convention.

Portugal has signed and ratified the European Convention on Human Rights and Biomedicine and its additional protocol prohibiting cloning.

Spain

Law 35 of
November 1988
(s. 20),³⁶ and Title
V of the Penal
Code
(s. 161(2))³⁷

It is a criminal offence to create identical human beings, by cloning or other procedures aimed at race selection (s. 20(2)(B)(k)).

It is also an offence to create human beings by cloning "in any of the variants or any other procedure capable of originating several identical human beings" (s. 20(2)(B)(l)).³⁸

European
Convention

Spain has signed and ratified the European Convention on Human Rights and Biomedicine and its additional protocol prohibiting cloning.

Sweden

Law No. 115 of
14 March 1991³⁹

A *fertilised* ovum or gamete *before fertilisation* that has been the subject of experimentation for purposes of research or treatment must not be implanted into a woman's body (s. 4). Also, experiments may not be performed on *fertilised* ova that have the purpose of developing methods for achieving potentially hereditary genetic effects (s. 2). Thus, cloning is implicitly prohibited if cloning can be said to involve "fertilisation."⁴⁰

Since experiments on fertilised ova are permitted up to 14 days if the purpose is not to develop methods of achieving potentially hereditary genetic effects (s. 2), cloning by embryo splitting is

³⁵ See Pereira 2001, 510.

³⁶ An English version is in the *Official Bulletin of the State*, No. 282, Thursday 24 November 1988.

³⁷ Title V of the Penal Code is translated in Lacadena 1996.

³⁸ As translated in the *Official Bulletin of the State*.

³⁹ For an English translation see Ministry of Health and Social Affairs 1991, Appendix 2.

⁴⁰ See UNESCO 1998, 11; and HGAC and HFEA 1998b, Annex E, for statements to the effect that embryo and oocyte cloning is implicitly prohibited with criminal sanctions.

allowed as an experiment on a fertilised ovum up to 14 days.

The National Council on Medical Ethics and the National Board of Gene Technology highlight the possibility that cloning using the Dolly technique might not be covered.⁴¹

UK

Human
Fertilisation &
Embryology Act
1990

The nuclear substitution of an embryo is prohibited (s. 3(3)(d)).

Licences are required for the creation of an embryo outside of the body (ss. 3(1)(a) & 1(2)), where an embryo is defined as a fertilised egg or an egg in the process of fertilisation (ss. 1(1)(a) & (b)).

The 1990 Act was recently held not to cover the Dolly technique.⁴²

Human
Reproductive
Cloning Act 2001

It is an offence to place in a woman a human embryo that has been created otherwise than by fertilisation (s. 1(1)).

US

No federal
legislation of
direct relevance⁴³

None.

The National Bioethics Advisory Commission (NBAC) recommended the introduction of a legislative prohibition on the use of cloning to create a child. This was to contain a sunset clause to ensure that Congress reviewed this prohibition after a specified period (three to five years).⁴⁴

The Food and Drug Administration (FDA) claims jurisdiction on the basis of its authority to regulate medical products for safety and efficacy,

"The use of cloning technology to clone a human being would be subject to both the biologics provisions of the Public Health Service (PHS) Act

and the drug and device provisions of the Federal Food, Drug, and Cosmetic Act Because of the unresolved safety questions pertaining to the use of cloning technology to clone a human being, FDA would not permit any such investigation to proceed at this time."⁴⁵

The FDA's claim to regulatory jurisdiction has, however, been questioned by some commentators.⁴⁶

Proposed federal
legislation exists

The Human Cloning Prohibition Bill was passed by the US House of Representatives in August 2001. It has yet to be considered by the Senate. The bill prohibits the cloning of human beings for any purpose, making it a criminal offence punishable by up to 10 years in prison and fines of at least \$1 million. It also prohibits the importation of treatments derived from cloned embryos.

If enacted, federal legislation banning cloning could be challenged on at least three constitutional grounds: (1) not being within the scope of the commerce clause; (2) violating scientists' First Amendment freedom of inquiry; and (3) violating a couple's or individual's constitutional right to privacy or liberty to make reproductive decisions.⁴⁷ The last two are also potential grounds for challenging state legislation.

There is also state
legislation

State legislation: e.g., California has enacted a five year ban on the cloning of human beings using the Dolly technique.⁴⁸ At least 21 states have considered similar bills. Indeed, many states ban cloning an individual, regardless of the funding source, however, the Alabama legislation "bans the use of government funds for any research using cloned cells or tissue," and Missouri legislation bans "the use of government funds for cloning an entire individual."⁴⁹

⁴¹ Information provided by Elisabeth Rynning.

⁴² *R (on application of Quintavalle) v Secretary of State for Health* [2001] EWHC 918, [2001] 4 All 1013.

⁴³ See NBAC 1997, 88.

⁴⁴ See NBAC 1997, especially iii-iv.

⁴⁵ FDA 2001a.

⁴⁶ See, e.g., Rokosz 2000.

⁴⁷ See Andrews 1997, F-5-F-7.

⁴⁸ Californian Health and Safety Code, s. 24185: see Harvard Law Review 1998, 2353.

⁴⁹ NBAC 1997, 104.

Appendix 5

The Legality of Germ-line Gene Therapy¹

<i>Country</i>	<i>Legislative provisions concerning germ-line gene therapy in addition to those addressing embryo research</i>
Austria	Act on Procreative Medicine 275/1992 prohibits germ-line gene therapy (s. 9(2)). ²
Belgium	None.
Canada	A voluntary moratorium on germ-line modification has existed since July 1995. ³

Art. 8.5 of the recent Tri-Council Policy Statement declares,

“Gene alteration (including ‘gene therapy’) that involves human germline cells or human embryos is not ethically acceptable. Gene alteration for therapeutic purposes and involving human somatic cells may be considered for approval.”⁴

This statement represents the view of the three main research funding councils of Canada.⁵

In May 2001, the federal government released a *Proposal for Legislation Governing Assisted Human Reproduction*.⁶ This proposal has been distributed in draft for discussion with the intention that the final version will be presented in 2002.

The proposed legislation makes it a criminal offence to knowingly “alter

¹ A version of this table originally appeared in Beylerveld and Pattinson 2000b.

² See Kriari-Catranis 1998, 53.

³ See Government of Canada 1996, 7. However, the government did little more than request a voluntary moratorium, which has proved to be ineffective (see Caulfield *et al.* 1997, 8).

⁴ See Medical Research Council of Canada *et al.* 1998.

⁵ For a discussion of the Tri-Council Policy Statement, see Molinari 1998.

⁶ See Health Canada 2001a. For discussion of this proposed legislation, see Health Canada 2001b and Caulfield 2001.

the genome of a cell of a human being or *in vitro* embryo such that the alteration is capable of being transmitted to its descendants" (s. 3(1)(b)).

Denmark Under Law No. 460 of 1997,⁷ artificial fertilisation may only take place if its objective is the uniting of a genetically unmodified egg with genetically unmodified sperm (s. 2).

Fertilised eggs that have been used in biomedical research may not be implanted if they have been genetically modified (s. 27(1)).

Finland Medical Research Act No. 488 of 1999⁸ prohibits research on embryos or gametes for the purpose of developing methods to alter hereditary characteristics, unless it aims to find a cure or to prevent a severe hereditary disease (s. 15). Violation is sanctioned by up to one year imprisonment or a fine (s. 25).

The working group (set up by the Ministry of Justice) reporting on the use of gametes and embryos in assisted fertilisation had proposed that no gametes or embryos be used in assisted fertilisation where the genetic heritage has been modified.⁹

France Law 94-653 of 29 July 1994¹⁰ (forming Art. 16-4 of the Civil Code) provides,

"No one is permitted to violate the integrity of human species;" and

"Any eugenic practice with a view to organising a selection of persons is prohibited. Without prejudice to research for the prevention and treatment of genetic diseases, no modification can be made to genetic traits with the purpose of modifying the descendants of a person."¹¹

Thus, germ-line gene therapy is prohibited.

Germany Embryo Protection Act 1990 explicitly prohibits germ-line gene therapy (s. 5(1)(2)).¹²

Violation is sanctioned with up to five years imprisonment or a fine (s. 5(1)(2)).

⁷ For an English translation see International Digest of Health Legislation 1997.

⁸ For an English translation see Bulletin of Medical Ethics 2000.

⁹ Information provided by Salla Lötjönen.

¹⁰ Information provided by Pierre Langeron.

¹¹ CCNE 1997.

¹² For an English translation see Bulletin of Medical Ethics 1990.

Greece None.

A National Bioethics Committee has been established to investigate the issues raised by the application of biological sciences and to investigate their moral, legal, and social dimensions and consequences.¹³

Ireland None.

Italy None.

The National Bioethics Committee (CNB) has published a document accepting somatic gene therapy while condemning germ-line gene therapy.¹⁴

Luxembourg No information.

Netherlands None.

The Health Council has recommended a moratorium on human germ-line gene therapy.

Portugal None.

However, some provisions of the Fourth Revision of the Constitution might be relevant. Art. 26 states that,

"The law shall guarantee the personal dignity and genetic identity of the human being, particularly in the creation, development and use of technology and in scientific experimentation."

Also, Art. 67.2(e) places a duty on the State to protect the family by "regulating assisted procreation, in such terms as safeguard human dignity."

Spain Under s. 15(2)(b) of Law 35 of November 1988, research on viable embryos can only be conducted where "the non-pathological genetic patrimony is not modified."¹⁵

¹³ Information provided by Panagiota Dalla-Vorgia

¹⁴ Information provided by Roberto Mordacci. There have been a series of proposed laws, many of which did not directly address germ-line gene therapy.

¹⁵ An English version of this Act appears in *Official Bulletin of the State*, No. 282, Thursday 24 November 1988.

- Sweden Under Law 115 of 1991,¹⁶ experiments on fertilised ova for the purposes of research or treatment "may not have the purpose of developing methods for achieving potentially hereditary genetic effects" (s. 2).
- UK Under the Human Fertilisation and Embryology Act 1990, a treatment licence cannot "authorise altering the genetic structure of any cell while it forms part of an embryo" (Sch. 2, para. 1(4)), and the same is true of a research licence, "except in such circumstances (if any) as may be specified in or determined in pursuance of regulations" (Sch. 2, para. 3(4)).¹⁷
- US No federal legislation explicitly addressing gene therapy.

The Food and Drug Administration (FDA) has claimed the jurisdiction to regulate gene therapy since 1993. The National Institutes of Health (NIH) and its advisory committee, the Recombinant DNA Advisory Committee (RAC), are also involved in the regulation of gene therapy clinical research.¹⁸ However, the FDA's jurisdiction is confined to ensuring the safety and efficacy of products and the NIH only has jurisdiction over proposals that it funds or take place in NIH-funded institutions.¹⁹

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¹⁶ An English translation is in Ministry of Health and Social Affairs 1991, Appendix 2.

¹⁷ For further information on the regulation of prenatal gene therapy in the UK see 5.8, above.

¹⁸ See FDA 2000.

¹⁹ See Marden and Nelkin 2000, 473.

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